Hiawatha - Robins - Cedar Rapids - Linn County - Marion - Iowa DOT

# Tower Terrace Road Corridor Management Plan Update 

Updated March 2019



## RESOLUTION NO. 03-19 <br> RESOLUTION ADOPTING TOWER TERRACE ROAD CORRIDOR MANAGEMENT PLAN UPDATE

WHEREAS, the Corridor Metropolitan Planning Organization (CMPO) has updated the original Tower Terrace Road Corridor Management Plan, completed March 18, 2010, in order to revisit the goals and objectives from the original plan and provide a more robust implementation plan; and

WHEREAS, the updated plan provides limits for environmental analyses, phasing into financially manageable sized construction projects, conceptual plans and cost estimates for each project, and design guidelines for the corridor; and

WHEREAS, input for the update included an advisory group, meetings with jurisdictions and agencies, and a public open house;

NOW, THEREFORE, BE IT RESOLVED that the CMPO hereby approves and adopts the 2019 update to the Tower Terrace Road Corridor Management Plan.


March 21, 2019
Date


## ACKNOWLEDGEMENTS

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## DEFINITIONS

Access Spacing: The distance between adjacent entry points to properties along roadways. May be longer or shorter depending on road curvature and design speed.

At-grade: On the same level or elevation.
Better Utilizing Investments to Leverage Development (BUILD) Grant: Federal program that grants funds to invest in transportation infrastructure, including transit, with an increased emphasis on projects that are located in rural areas.

Back of Curb: The farthest edge of a raised curb from the centerline.
Clear Zone: The total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles.
Crest K: The length of the crest (hill) vertical curve divided by the total change in gradient in the vertical curve. Used to describe how sharp a hill is. The smaller the k value, the sharper the hill.

Complete Streets: Transportation facilities that include safe, attractive, and comfortable access and travel for all anticipated modes of travel.

Construction Administration: Ensures that construction projects are completed in an environmentally safe, efficient, and safe manner. May also help with scheduling, material certification, and sourcing.

Curve Length: The length of a horizontal or vertical curve when it is placed into an alignment.
Design Speed: The selected speed used to determine the various geometric features of the roadway.
Diverging Diamond Interchange: An alternative to the conventional diamond interchange in which two directions of traffic on the non-freeway road cross to the opposite side of the roadway on both sides of the bridge at the freeway eliminating the need for left-turning vehicles to cross the paths of approaching through vehicles.

Doweled Median: Strip of PCC concrete that is between the lanes of opposing traffic on a divided highway. Built on top of the lane pavement and held in place with straight or deformed rebar, or dowels.

Earthwork: The disturbance of soil or earth by any means, including excavation (including subsurface), tunneling, drilling, infilling, or land rehabilitation.

Environmental Analysis: Analysis determining if federal action has the potential to cause significant environmental effects.
Environmental Clearance: Gained from the Federal Highway Administration, it is a mandatory requirement to begin construciton for any expansion, modernization, or new construction.

Environmental Review: The process of reviewing a project and its potential environmental impacts to determine whether it meets federal, state, and local environmental standards.

Federal Aid: Monetary assistance granted by a federal government to a person or group in support of an enterprise regarded as being in the public interest.

## DEFINITIONS

General Obligation Bonds (GOB): A public entity borrows money against the future revenues expected to be generated by the city through taxes and/or fees over time.

Grade: Also called slope; the degree or angle at which something rises, expecially roadways or paths.
Grade Separated: A junction of two or more surface transport alignments at different heights so they will not disrupt traffic on the other transit routes, such as a bridge or tunnel.

Green Street: A street that includes tree plantings and other plant materials to create a greener roadway in terms of appearance; intending sustainable design practices be included in the design of roadways to lessen environmental impact.

Gutter Pan: Part of a curb and gutter section of the roadway; the extension of the roadway pavement that water and vehicles must traverse before coming in contact with the curb.

Horizontal Alignment: The positioning of a roadway, as shown in the plan view, using a series of straight lines called tangents connected by circular curves.

Horizontal Curve: Provides a transition between two straight strips of roadway, allowing a vehicle to negotiate a turn at a gradual rate rather than a sharp cut.
$\mathbf{K}$ Value: The horizontal distance required to achieve a $1 \%$ change in the slope of a vertical curve. Used to describe how sharp a valley (or sag) or hill (or crest) is. The smaller the $k$ value, the sharper the valley or hill.

Logical Termini: Rational end points for a transportation improvement or a review of the environmental impacts of a certain project.

Median: Reserved area that divides opposing lanes of a roadway.
Median Nose: The rounded or square end of a median between a divided roadway. Usually located at an intersection or other crossing.

Object Setback: An area provided adjacent to the roadway that is clear of obstructions measure from the face of curb. The purpose of the object setback is to provide an operational clearance to increase driver comfort and avoid a negative impact on traffic flow.

Park Strip: The area of land between the back of curb and the sidewalk.
Point of Vertical Intersection (PVI): The point where two adjacent grade lines meet in a vertical curve.
Public Frontage: The land between the street and the private property line adjacent to the roadway.
Prestressed Beam Bridge: A steel reinforced concrete bridge that consists of a concrete slab deck with supporting beams underneath that carry the load of the bridge. The beams are either precast or cast and in place with stress being introduced into the reinforcing fibers before a weighted load is applied.

Revitalize lowa's Sound Economy (RISE): Program that promotes economic development in lowa through the establishment, construction, and improvement of roads and streets. Targeted toward value-adding activities that boost the local economy and provide the maximum economic impact to the state.

Right-of-Way (ROW): The land (usually a strip) acquired for or devoted to transportation purposes.

## DEFINITIONS

Right-of-Way Acquisition: The act of acquiring privately owned land for use on public projects or programs. This may include property along roadways or parcels of land for a building.

Platting: To plan or make a map of an area before design or construction work takes place.
Primary Road Funds: Money used for the establishment, construction, and maintenance of the primary road system. The Primary Road System consists of roads and streets, both inside and outside the boundaries of municipalities, which are under the jurisdiction of the DOT.

Road Use Tax Allocations: Major state funding source for the construction, maintenance, and supervision of roads.
Sag K: The length of the sag (depression) vertical curve divided by the total change in gradient in the vertical curve. Used to describe how sharp a valley, or sag, is. The smaller the $k$ value, the sharper the valley.

Slab Bridge: A short-span bridge consisting of a reinforced concrete slab resting on abutments.
Station: Used as a measurement of distance along an alignment. Each station is 100 feet.
Stopping Sight Distance: The distance needed for drivers to see an object on the roadway ahead and bring their vehicle to a stop safely before a collision occurs.

Swap Funds: Switching federal aid dollars for primary road funds.
Tax Increment Finance (TIF): Depending on the community, and whether TF districts are available, TF funds can be used to bond projects and pay off the bond using an incremental tax from development. Available funds are tied to the value of the TIF district.

Traffic Analysis: A detailed examination and study of a transportation system or network. Involves data collection, analyzing the data, and then a report summarizing the findings.

Typical Sections: A section made by a plane cutting through the roadway at a right angle. Used as a guideline for planning of a project and the quantities of materials required.

Uneconomic Remnants: A portion of a property that is left after acquiring right-of-way that cannot be developed on its own. The remainder of the property is either too small or the configuration is such that does not allow for development.

Vertical Alignment: The vertical aspect of the road, including crest (hills) and sag (valleys) curves, and the straight grade lines connecting them.

Vertical Clearance: The maximum vertical drop distance from the lowest point of a bridge span, or other similar structure, down to the ground or water surface beneath the bridge span.

Vertical Curve: Provides a transition between two sloped roadways, allowing a vehicle to negotiate the elevation rate change at a gradual rate rather than a sharp cut.

## ACRONYMNS

AASHTO: American Association of State Highway and Transportation Officials
BUILD Grant: Better Utilizing Investments to Leverage Development
BVCS: Beginning Vertical Curve Station
BVCE: Beginning Vertical Curve Elevation

Corridor MPO: Corridor Metropolitan Planning Organization
CN RR: Canadian National Railway

DOT: Department of Transportation

DDI: Diverging Diamond Interchange
FA: Federal Aid

FFY: Federal Fiscal Year
GOB: General Obligation Bonds
ICAAP: Iowa Clean Air Attainment Program

NEPA: National Environmental Policy Act
PCC: Portland Cement Concrete

PVI: Point of Vertical Intersection
RISE: Revitalize Iowa's Sound Economy
ROW: Right-of-Way

SUDAS: Statewide Urban Design and Specifications
TIF: Tax Increment Financing

TIGER Grant: Transportation Investment Generating Economic Recovery
VTTS: Value of Travel Time Savings

## INTRODUCTION

## OVERVIEW

This plan is an update of the original Tower Terrace Road Corridor Management Plan completed in March of 2010.

The purpose of this plan is to revisit the goals and objectives identified in the 2010 plan to confirm their application to the current vision of the jurisdictions along the corridor. Additionally, this plan builds upon and supplements the work originally done for the Corridor Management Plan, taking it to the next step to provide a more robust implementation plan.

The implementation plan includes:

- Providing limits for environmental analyses,
- Phasing the corridor into financially manageable sized construction projects,
- Developing conceptual plans and cost estimates for each project,
- Assigning priority for each project,
- Recommending cost sharing,
- Identifying funding sources, and
- Developing an implementation schedule.


FIGURE 1: Existing Segment of Tower Terrace Road in Hiawatha/Robins, 2018. Aerial: Linn County, 2017

Jurisdictions and agencies involved include:

- City of Hiawatha
- City of Robins
- City of Cedar Rapids
- Linn County
- City of Marion
- Iowa Department of Transportation (DOT)


## GENERAL BACKGROUND

Tower Terrace Road has been planned since the 1960s, and evidence of subdivision plats with right-of-way reservations occurred as early as 1977. Fifty years later, this plan is starting to become reality.

There are a few sections of Tower Terrace Road that exist as two-lane, paved, rural roadways (see Figure 1). The City of Marion has constructed segments of Tower Terrace Road to date, through public/private partnerships, which generally follow the 2010 Corridor Management Plan concept (see Figure 2). At the time of this update, the City of Marion has the longest completed Tower Terrace Road segments that follow the 2010 Corridor Management Plan concept.


FIGURE 2: Existing Segment of Tower Terrace Road in Marion, near 10th Street, 2018.
Aerial: Linn County, 2017; Photo: City of Marion, 2018

## INTRODUCTION

More recently, an interchange at I-380 and Tower Terrace Road is in the stages of design through the lowa DOT and is expected to be constructed starting in 2021.

Corridor MPO Staff involved an Advisory Group in the development of the original Corridor Management Plan. This Advisory Group included representatives from Hiawatha, Robins, Cedar Rapids, Marion, Linn County, and the Iowa DOT. For this plan update, the Advisory Group was also instrumental in devising and making recommendations.

## USE OF THIS DOCUMENT

The purpose of this document is to advance the concepts developed in the 2010 Tower Terrace Road Corridor Management Plan into an implementable set of individual, phased projects that can be completed on schedule. To create a reasonable plan that can be accomplished, this document includes project limits, more detailed budgetary costs, priorities, and timelines.

This plan is a standalone document that incorporates the applicable elements of the 2010 Tower Terrace Road Corridor Management Plan and the current community vision for this corridor with updated design standards and practices. The intent is to identify the major steps to advance each project to construction, including:

- Environmental Review
- Preliminary Plans
- Right-of-way Acquisition
- Preparation of Bid Documents
- Funding
- Construction

This plan defines environmental review limits for major sections of Tower Terrace Road with logical termini (e.g., connecting from major intersection to major intersection and not bias the environmental analysis of the adjacent major sections). Within these environmental review limits will be a subset of individual construction projects.

This plan contains cost estimates for each project as a standalone construction effort. In addition to the project cost estimates, this plan also contains funding strategies and cost-saving options that jurisdictions could employ to assemble a funding package for construction of each project.


FIGURE 3: Existing Tower Terrace Road, near 35th Street in Marion, 2018


FIGURE 4: Existing Tower Terrace Road, near Winslow Road in Marion, 2018


FIGURE 5: Existing Tower Terrace Road, near Alburnett Road in Marion, 2018

An approximate timeline for construction is included in the Projects section of this plan. It details the priorities used to develop the project timeline (such as current readiness to build, funding that is already in place, etc.).

Finally, the Appendix includes plan and profile sheets, and key cross sections for each of the 14 remaining projects. These conceptual plans are intended to demonstrate the corridor design principles developed by the Advisory Group. The plan sheets are revised from the original alignment of Tower Terrace Road to provide more curvature to the roadway to help control speeds and make the corridor more visually appealing.

This plan is intended to build upon and update the previous plan. The Tower Terrace Road corridor boundaries for this plan are from Edgewood Road to Highway 13, spanning six jurisdictions, including the lowa DOT which has jurisdiction over the I-380 interchange at Tower Terrace Road and IA Highway 13 at the east end of the Tower Terrace Road corridor. Because this is a joint effort of the Cities, County and lowa DOT, it is important to maintain the cooperation that has been key to the successful advancement of Tower Terrace Road to this point.

## PLAN UPDATE PROCESS

The plan update was developed by assembling an Advisory Group, much like the 2010 Plan, representing the four cities (Cedar Rapids, Hiawatha, Marion, and Robins) and Linn County. The Advisory Group also included the lowa DOT as they are the jurisdictional agency for I-380 and for IA Highway 13, and Corridor MPO Staff as facilitator and project manager. The group members represent a mix of skills and expertise including planners, administrators, engineers, and policy-makers. The Advisory Group was charged with the tasks of determining the Planning Area, reviewing the Plan Vision Statement, and revisiting the Plan Goals, as well as providing feedback on design elements, alignment options, and implementation plan.

The plan update process began with data collection and a series of two meetings with the Advisory Group to work on vision, goals, general design, and alignment (meeting minutes of each Advisory Group meeting are in the Appendix). Then, one-on-one meetings were held with each of the Advisory Group members to identify issues and concerns unique to each jurisdiction. A draft plan was submitted and was the focus of the third Advisory Group meeting. A public information meeting was held to present the plan and help finalize the process, followed by a fourth Advisory Group meeting. After the fourth meeting, separate outreach from this plan update was completed by the lowa DOT for the I-380 and Tower Terrace Road interchange. Additional decisions by the Advisory Group and Corridor MPO followed that outreach, and the final, updated Tower Terrace Road Corridor Management Plan Update was completed. Figure 6 is a flow chart showing the course of plan update development.


FIGURE 6: Flow Chart of Plan Update Development

As part of the update process, the Vision Statement was slightly revised and is included here in its revised form. Likewise, the original goals were re-examined. The Advisory Group recommended the Goals be less abstract and refined to focus on implementation of the projects.

For reference, a summary of changes to the Tower Terrace Road Corridor Management Plan are shown in Table 1.

## Vision Statement:

The Tower Terrace Road corridor will be a regionally-significant, multi-modal transportation corridor constructed for the benefit of citizens in multiple jurisdictions that is safe, efficient, effective, aesthetically appealing, and environmentally friendly.

## Goals:

- Update the document to guide the implementation of the Tower Terrace Road corridor

Acquire a contiguous east-west transportation corridor Build the intended arterial transportation network Develop funding sources and agreements for the orderly funding and construction of Tower Terrace Road Plant at least 30\% of the green space of the Tower Terrace Road corridor in native plant species pollinator habitat

| SUMMARY OF TOWER TERRACE ROAD |  |
| :--- | :--- |
| CORRIDOR MANAGEMENT PLAN CHANGES |  |

TABLE 1: Summary of Tower Terrace Road Corridor Management Plan Changes

PREVIOUS PUBLIC INVOLVEMENT
Tower Terrace Road has included a public involvement program from the start of plan development. From the 2010 Plan effort, a Stakeholders Group was comprised of more than 30 area residents, including homeowners, developers, business owners, environmental organizations, and school district representatives. This Stakeholder Group was identified to solicit input from those most directly affected by the corridor.

The Stakeholders Group met six times in the initial plan development from 2010. The group was concerned that Tower Terrace Road will someday look like Collins Road. Coinciding with that concern, that group indicated they generally wanted the roadway to be as green as possible, while providing travel accommodations for all modes of transportation. They preferred a boulevard section wide enough to allow room for turn lanes at intersections and street trees where feasible.

As part of the 2010 plan, an Advisory Group met 15 times over a two-year period to discuss the planning process, fundamental design parameters, and plan implementation.

## ADVISORY GROUP MEETINGS

For this plan update, an Advisory Group was again formed and comprised of jurisdictions and agencies along the corridor. This new Advisory Group met four times to guide the update to the Tower Terrace Road Corridor Management Plan. Meeting minutes are included in the Appendix.

## JURSIDICTION AND AGENCY MEETINGS

Outside of Advisory Group meetings, individual meetings were held with jurisdictions and agencies along the corridor to help inform this plan update. These meetings included key staff from the jurisdiction/agency, as well as staff from the Corridor MPO and consultant. At these meetings, key issues related to the corridor were discussed. These meetings are summarized in the following paragraphs, as well as how the plan update was modified by these meetings.

## CITY OF CEDAR RAPIDS

The City of Cedar Rapids is interested in a roundabout analysis at the intersection of relocated East Robins Road and Tower Terrace Road, across from St. Mark's Church driveway. The concern is whether northbound left turning traffic from East Robins Road onto westbound Tower Terrace Road will overwhelm a traffic signal installation during the morning peak hour. Also, Cedar Rapids has development agreements or preliminary platting in place for most of the segments of Tower Terrace Road within the city limits. In particular, from C Avenue west, the schedule of construction of Tower Terrace Road will likely be tied to development along the corridor. The properties along the proposed corridor will be assessed as they develop for one half of a residential street width (unless the development property straddles both sides of Tower Terrace Road, in which case the property would be assessed the full width of a residential street). Additionally, the City of Cedar Rapids desires to light the corridor from the median, and lighting options are included in the Design section of this update.

## CITY OF HIAWATHA

The City of Hiawatha indicated the pavement on existing Tower Terrace Road from North Center Point Road to Robins Road is in good shape and would like to see that pavement used in place as Tower Terrace Road develops. There is a need for sanitary sewer extension along Tower Terrace Road along this same section. Hiawatha would consider undergrounding the overhead power, although the power lines on the joint city limit line between Hiawatha and Robins is on the Robins side. Hiawatha also noted they would like to consider North Center Point Road and Tower Terrace Road as a potential location for a roundabout, which is shown as an potential option in this update. Additionally, the driveway for the Tower Terrace Mobile Home Park should be a right-in/right-out driveway due to its close proximity to the proposed interchange. In the future, an additional right-in/right-out access may be considered between North Center Point Road and Stamy Road, and Commerce

## PUBLIC INVOLVEMENT

Road should be right-in/right-out. The City of Hiawatha indicated they will not assess private property for Tower Terrace Road improvements.

## CITY OF MARION

The City of Marion assesses developers along Tower Terrace Road one half of the equivalent value of a 26 -foot wide street, 7 inches thick. Marion then leverages that assessment with city funds to build the full width of Tower Terrace Road. Similarly, the city assesses for a 4-foot wide sidewalk and "the standard" for storm sewer or other utilities, such as water mains to meet the city's future needs. If oversizing is needed, the city covers that cost. If a development occurs after a section of Tower Terrace Road is constructed, a connection fee to the roadway is charged to the developer using the previously described rationale. Marion will convert half of Indian Creek Road to a trail, north of Tower Terrace Road in the near future when Tower Terrace Road cuts off existing Indian Creek Road. The City of Marion agrees with building trails on both sides of Tower Terrace Road, as shown in this update. In the future, a trail will be extended along Indian Creek and will need to connect to the Tower Terrace Road trail. A previous study of the Tower Terrace bridge over Indian Creek was completed by the City of Marion and includes bridge costs. West of Indian Creek, Marion's priority is to have Tower Terrace Road constructed since the project already has swap funding. East of Indian Creek, Tower Terrace Road will be constructed as development occurs. The bridge over Indian Creek will be constructed as funding become available. The City of Marion indicated they anticipate adding right-in/right-out driveways between Irish Drive and Alburnett Road. Also, the City of Marion wants to see a roundabout at 44th Street Extension, which is shown in this update.

## CITY OF ROBINS

The City of Robins is very concerned about the funding for the sections of Tower Terrace Road that are in the City of Robins. The concern is that the benefit of Tower Terrace Road to the City of Robins is very modest considering much of the ground around the most expensive part of the project (the two bridges) is the least developable land. There might be some slight interstate access benefit to Robins residents, but nowhere near the value to justify several million dollars investment into Tower Terrace Road. As part of this update, Robins requested a comparison of alternatives with an overpass over the Canadian National Railway versus an at-grade railroad crossing. Also, Robins requested to see an alternative comparison of a straight alignment of Tower Terrace Road on the common city limit line with Cedar Rapids between Council Street and Robins Road. Additionally, Robins requested to see projected traffic volume estimates on Tower Terrace Road for the postpartial build condition. All three of these requests are included in this update. Much like the City of Hiawatha, the City of Robins does not intend to assess any private property owners for Tower Terrace Road improvements.

## LINN COUNTY

Linn County noted that the county is interested in sustainable practices being used along the corridor, such as including native species for plantings. As noted in the goals, this is included in this update. Linn County also indicated they understand this will be a regional, county project and Linn County may contribute to the cost at some point.

## IOWA DOT

The lowa DOT noted they had previously held a meeting focused on the interchange of Tower Terrace Road with I-380. Based on the initial findings of the interchange environmental process, the lowa DOT reduced the footprint of the proposed interchange to minimize impacts to the existing mobile home park on the north side of Tower Terrace Road, west of North Center Point Road. Cedar Rapids and Hiawatha will be responsible for completing the environmental process on their respective sections of the project (Edgewood Road to I-380 and I-380 to North Center Point Road) and implementing the design and construction. It is ideal to bid all three projects together. The lowa DOT's current schedule is 2021 construction of the interchange. There is $\$ 4$ million of federal aid available to Hiawatha and Cedar Rapids to apply toward their sections of the overall project. The lowa DOT and their consultant team continued design of the I-380 and Tower Terrace Road during the development of this plan update.

## PUBLIC INVOLVEMENT

## ADDITIONAL STAKEHOLDER MEETINGS

As a follow up effort with project stakeholders, under the plan update, Corridor MPO staff met with a local bicycle advocacy group concerning bicycle accommodation through the Tower Terrace Road interchange over I-380. This group was asked whether they prefer on-street bicycle lanes through an interchange or a single separated trail on one side of the interchange with trail underpasses under the interchange ramps. The latter option was preferred at that time.

As the I-380 and Tower Terrace Road interchange design progressed, another option for the trail crossing surfaced: an at-grade, signalized intersection. This option was again presented to a local bicycle group, along with safety data. This option was found to be a viable alternative. At the time of this update, an at-grade, signalized option was planned for the interchange (see Appendix).

## PUBLIC OUTREACH

As part of the update, a public information meeting was held on October 30, 2018 at Hiawatha City Hall from 5 to $6: 30$ p.m. The meeting was well promoted by the Corridor MPO, as well as jurisdictions and agencies through traditional and social media channels. As a result, attendance was estimated at 300 people (see Figure 7).

At the open house, identical presentations were given at 5:15 and 6 p.m. Additionally, Corridor MPO and consultant staff were at stations and boards and had many discussions with attendees about the progress of the plan update. In all, 12 boards were presented, including a mix of education and possible preferences for Tower Terrace Road.

Three preference boards were available at the meeting, and attendees had the opportunity to learn about the possible options and vote on their


FIGURE 7: Attendees at October 30, 2018 Public Meeting preference. The following summarizes preferences:

- Median Treatments: Grass (19 votes), Native/Pollinator (81 votes), and Mix (13 votes)
- I-380 Crossing: At-Grade (7 votes), Underpass (120); (Note: An At-Grade, Signalized Crossing was subsequently provided as an option by the lowa DOT)
- Cedar Valley Nature Trail Crossing: At-Grade (6), Underpass (116)

In order to gather feedback and input, comment forms were provided before, during, and after the public open house. In total, 56 comment forms were gathered, including 51 from the open house and 5 before or after the open house. For reference, a summary of all comments is included in the Appendix. The following summarizes the most common comments:

- In favor of pedestrian underpass at I-380 (41 total)
- In favor of pedestrian underpass at Cedar Valley Nature Trail (19 total)
- Build Tower Terrace Road as four-lane now (5 total)
- Keep bike lanes on Tower Terrace Road under four-lane scenario (4 total)
- Accelerate the schedule (4 total)


## PUBLIC INVOLVEMENT

Separate from this plan update, the lowa DOT is planning a public hearing regarding the I-380 and Tower Terrace Road interchange. While this outreach is separate from this update, the results will be of interest to the Advisory Group, jurisdictions, and agencies involved in making future decisions for the Tower Terrace Road Corridor Management Plan update. However, the public hearing regarding the interchange was beyond the timeframe of this update. Information on the Iowa DOT's public hearing can be found on the lowa DOT website (www.iowadot.gov).

## FUTURE OUTREACH

This plan update provides recommendations for the development of Tower Terrace Road. As the road is planned, designed, and built, additional outreach efforts are recommended to be completed at key points of development, allowing the public to become informed and provide input for final decisions for various priorities and portions of Tower Terrace Road.

It is recommended this outreach be completed by the appropriate jurisdistions or agencies, along with consultants hired to plan or design sections of the roadway. Various public engagement methods should be identified and completed during stages of project development, such as during preliminary design and before construction begins. After each outreach effort, findings should be brought to decision makers in order to create the best possible solution that as closely as possible aligns with the Vision Statement and Goals for this plan update.


FIGURE 8: Tower Terrace Road Overview Map; Aerial: Linn County, 2018

## OVERVIEW

The planning area was expanded to the west of I-380 to include the relocation of Edgewood Road as the western end of the corridor. As such, this plan update covers Tower Terrace Road from Edgewood Road extension to lowa Highway 13 (see Figure 8). Note: The north-south arterial roadway west of the I-380 and Tower Terrace Road interchange is currently named Miller Road and will eventually be renamed Edgewood Road. For this plan, Miller Road is referenced as Edgewood Road.

## CONFLICT POINTS

The 2010 Tower Terrace Road Corridor Management Plan identified five conflict points:

- C Avenue Intersection with multiple intersection approaches (up to six with C Avenue, Tower Terrace Road, and Main Street/East Robins Road)
- Meadowknolls Neighborhood and concerns about cut through traffic
- North 10th Street Intersection/Linn-Mar Campus and concerns about coordinating the Tower Terrace Road alignment with the proposed new athletic stadium and existing campus buildings
- Grey Fox Drive Connection to Tower Terrace Road and concern about cut through traffic
- Dry Creek/Canadian National Railway Crossing

Two additional conflict points were identified in this update:

- I-380 and Tower Terrace Road Trail Crossing
- Cedar Valley Nature Trail conflict with Tower Terrace Road


## Conflict Points Already Addressed

Three of the conflict points have already been addressed through construction of or the design of the sections of Tower Terrace Road in these areas:

- C Avenue Intersection
- Meadowknolls Neighborhood
- North 10th Street Intersection/Linn-Mar Campus


## C Avenue Intersection

C Avenue and East Main Street/East Robins Road currently intersect at a 22 -degree skew angle. C Avenue is a north-south rural route with few accesses north of Tower Terrace Road, while East Main Street/East Robins Road provides a northwest to southeast route with a mix of residential driveways and local street accesses. A traffic signal currently exists at the C Avenue and East Robins Road intersection.

The planned alignment of Tower Terrace Road would create a six-legged intersection at C Avenue and East Main Street/East Robins Road. Six leg intersections are not unheard of, particularly with historical diagonal routes. However, as traffic volumes grow, signal timing becomes an issue, particularly if good traffic flow is desired on any of the corridors. In order to avoid a sixlegged intersection, one route must be excluded, either by realignment or termination (cul-de-sac). As previously considered, it is reasonable to sever the diagonal East Main Street/East Robins Road. This would create a standard, perpendicular intersection between Tower Terrace Road and C Avenue.

East Main Street/East Robins Road will be realigned to connect directly to Tower Terrace Road as offset " T " intersections on either side of the C Avenue Intersection. This would allow travel on the diagonal route that East Main Street/East Robins Road offers, while still providing access to the cardinally oriented routes.

As an alternative, during preliminary design of Tower Terrace Road, a roundabout analysis was performed and determined a four-legged roundabout would operate better than a traffic signal at C Avenue and Tower Terrace Road. Therefore, the conflict point at C Avenue and Tower Terrace Road has been resolved with a roundabout (see Sheet D. 14 in the Appendix). Additionally, East Main Street will be re-routed to intersect Tower Terrace Road at Summerset Avenue (see Sheet D. 13 in the Appendix), and East Robins Road will be realigned across from St. Mark's Church driveway (see Sheet D. 15 in the Appendix).

Of note, during the design phase, the City of Robins would like to explore a five-legged roundabout at C Avenue and Tower Terrace Road to connect East Main to the roundabout.

## Meadowknolls Neighborhood

East of C Avenue, there is a county subdivision known as Meadowknolls. This 18 -home subdivision is only accessed from East Robins Road. Within the subdivision, a 100-foot right-of-way width has been reserved for Tower Terrace Road.

The 100 -foot wide right-of-way reserved within the Meadowknolls neighborhood is narrower than the 120 -foot or 140 -foot wide right-of-way desired for Tower Terrace Road. The goal of the Tower Terrace Road corridor is to provide a safe and efficient transportation accommodations for all modes of travel while providing an aesthetically pleasing roadway that will have positive impacts on the surrounding area. The narrow right-of-way in the Meadowknolls neighborhood will force the dimensions of certain roadway elements to slim down. Several options can be considered, but it is important to provide consistent accommodation throughout the corridor. The proposed typical section maintains the bike lanes and side paths, while reducing the width of green space. The configuration of traveled lanes and side paths provides a recommended 10 -foot wide clear zone, but does not leave room for street trees within the median or parking areas in the full buildout, even if certain elements, such as bike lanes, are excluded.

As part of the Tower Terrace Road design from C Avenue to Alburnett Road, neighborhood meetings developed a solution to end Meadowknolls as a cul-de-sac south of Tower Terrace Road. The north leg of Meadowknolls Road meet at a "T" intersection with Tower Terrace Road. The primary concern by the Meadowknolls neighborhood was cut-through traffic; however, both streets are going to be dead-ends so cut-through traffic will not be an issue (see Sheet D. 16 in the Appendix).

## North 10th Street/Linn-Mar Campus

The location of the Tower Terrace Road and North 10th Street intersection was dictated by right-of-way on the west side and the location of Linn-Mar Community School District's new football stadium on the east side. Other impacts to right-of-way design included Linn-Mar's existing softball field, the residential acreage to the north, and an office building with a pond to the south. The property line for the office building in the southwest quadrant of the intersection was shaped during platting to allow for reverse curves on the roadway that would reduce the impact of a 120-foot wide right-of-way on the acreage to the north. While horizontal curvature within an intersection is not ideal, it may serve to reduce the average speed limit as vehicles enter the school campus.

## DESIGN

The intersection of Tower Terrace Road and North 10th Street was built with left turn lanes and may warrant additional right turn lanes as through traffic grows in the future.

As Tower Terrace Road bisects the campus, provisions for pedestrian accommodations are important. The planned 120-foot wide right-of-way will allow enough room for a trail on both sides of the road. Proposed sidepaths along North 10th Street were extended north to provide a pedestrian access to Excelsior Middle School.

As planned, Tower Terrace Road has been designed and constructed through the Linn-Mar campus with access arrangements and coordination to avoid campus infrastructure in place (see Sheets D. 22 and D. 23 in the Appendix).

## I-380 and Tower Terrace Road Trail Crossing

As the l-380 and Tower Terrace Road interchange design progressed, an at-grade, signalized option for the trail crossing was developed. Safety data shows this is a viable alternative to a grade-separated option. At the time of this update, an at-grade, signalized option was planned for the interchange (see Appendix).

## Cedar Valley Nature Trail Conflict with Tower Terrace Road

As noted by the City of Hiawatha and this update, the portion of Tower Terrace Road is in good condition where the Cedar Valley Nature Trail crosses the roadway at grade. At such time as to when that portion of Tower Terrace Road is reconstructed, a grade-separated crossing or underpass should be considered.

## Remaining Conflict Points

The conflict points remaining to be resolved are the concern of cut through traffic in the Grey Fox Drive neighborhood and the Dry Creek/Canadian National Railway Crossing.

Just east of Robins Road, the future alignment of Tower Terrace Road will cross Dry Creek and a single railroad track, which is owned and operated by the Canadian National Railway. South of Tower Terrace Road and east of the Canadian National Railway track is a residential subdivision that is planned to connect with Tower Terrace Road at Grey Fox Drive. From the 2010 public involvement, concerns were raised by the residents over the proximity of Tower Terrace Road to this subdivision and the potential for cut through traffic from the Tower Terrace Road connection. Looking at the aerial image in Figure 9, Grey Fox Drive accesses the neighborhood and does not directly connect through to a major street.

Cut-through traffic is caused by drivers desiring a faster route to a destination. Therefore, the likelihood of cut-through traffic is low as Grey Fox Drive to Woodcrest Street or Fox Tail Drive to Council Street is not a faster route. The faster travel path is continuing on Tower Terrace Road and making a right onto Council Street.


FIGURE 9: Tower Terrace Road at Grey Fox Drive; Aerial: Linn County, 2018

The other conflict point is the crossing of Canadian National Railway and the crossing of Dry Creek. Tower Terrace Road will require a bridge over Dry Creek regardless whether the roadway alignment is curved or straight. Crossing the railroad could be done at-grade with a signalized crossing of the railroad track at the same level or by a grade-separation with a bridge over the railroad track.

The preference of Canadian National Railway is to have a grade-separated crossing over the railroad, primarily because of safety reasons. However, railroad representatives indicated they may consider an at-grade crossing if two other at-grade crossings in the metro area were eliminated. The concept behind eliminating crossings in exchange for a new crossing is to reduce exposure of vehicle traffic to train traffic, thereby reducing the possibility of crashes and limiting or reducing Canadian National Railway's exposure to potential liability. A copy of the correspondence with Canadian National Railway is included in the Appendix. This correspondence includes the minimum horizontal and vertical clearances needed for a bridge over the railroad.

In order to provide the best option for Tower Terrace Road, a cost analysis was completed to compare an at-grade versus grade-separated crossing.

- At-Grade: The combined cost of a bridge over Dry Creek and an at-grade rail crossing is approximately $\$ 1.4$ million.
- Grade-Separated: The combined cost of a bridge over Dry Creek and a bridge over the Canadian National Railway is approximately $\$ 3.7$ million (See Structural Memorandum in the Appendix for more detai).
- The additional construction cost of a bridge over Dry Creek and the railroad is approximately $\$ 2.3$ million.

The above estimate for a grade-separated railroad crossing only includes the construction cost. It does not take into consideration the costs required to remove the two other existing, at-grade railroad crossings., as required by the Canadian National Railway. This cost analysis also did not take into consideration the increased delay to vehicle traffic on Tower Terrace Road when a train is present. According to the Federal Railroad Administration crossing inventory, this section of Canadian National Railway carries two trains per day.

To estimate the value of the lost time with an at-grade crossing, the following assumptions were made (see Table 2 on page 23):

- USDOT Recommended Hourly Value of Travel Time Savings (VITS) - All Purpose Trips: $\$ 14.10$ per hour, adjusted to $\$ 22.39$ per hour over the 50 -year lifespan of the bridge
- Average Daily Traffic on Tower Terrace Road over the life of the bridge ( 50 Years): 16,600 vehicles per day, from the previous 2010 Tower Terrace Corridor Management Plan
- Estimated train blockage of Tower Terrace Road: 7 minutes per train, estimated from rail crossing delay study of Union Pacific Railroad at Duff Avenue in Ames, Iowa
- Estimated vehicle occupancy: 1.7 persons per vehicle, from the Federal Highway Administration National Household Travel Study

From these assumptions, a present-day cost of delay, excluding inflation, is approximately $\$ 4.8$ million. This estimate is much more than the estimated $\$ 2.3$ million in additional construction costs, as noted on page 25.

Using the findings from the delay savings analysis, the bridge over Canadian National Railway is the lower cost alternative. Also, there would be costs to remove two existing railroad crossings on Canadian National Railway track somewhere within the metro area. Those costs could likewise be substantial if an existing property, or properties, must to be purchased in order to close the rail crossing.

| ESTIMATED COST OF DELAY FOR <br> AT-GRADE RAIL CROSSING OF CANADIAN NATIONAL RAILWAY |  |
| :---: | :---: |
| PARAMETER | VALUE |
| Daily Traffic on Tower Terrace Road (Average over life of bridge) | $\frac{16,600 \text { veh }}{\text { day }}$ |
| Arrival Rate at Crossing, Vehicles/Minute | $\frac{16,600 \text { veh }}{\text { day }} \times \frac{1 \text { day }}{24 \text { hours }} \times \frac{1 \text { hour }}{60 \mathrm{mins}}=11.53 \mathrm{veh} / \mathrm{min}$ |
| Proportion of Time Train is Present | $\frac{2 \text { trains }}{\text { day }} \times \frac{7 \mathrm{~min}}{\text { train }}=14 \mathrm{~min} / \text { day }$ |
| Number of Vehicles Delayed per Day | $\frac{11.53 \mathrm{veh}}{\min } \times \frac{14 \mathrm{~min}}{\text { day }}=161.4 \mathrm{veh} / \text { day }$ |
| Number of Minutes Vehicles are Delayed | If a train occupies the track for 7 minutes, assume the average wait is 4 minutes (some vehicles arrive when the train is nearly passed) |
| Vehicle Delay per Day | $\frac{161.4 \text { veh }}{\text { day }} \times \frac{4 \text { min }}{\text { train }} \times 2 \text { trains }=1291.2 \mathrm{veh} \cdot \mathrm{~min} / \text { day }$ |
| Estimated Person-Hours per Day | $\frac{1291.2 \mathrm{veh} \cdot \mathrm{~min}}{\text { day }} \times \frac{1.2 \text { person }}{\text { veh }} \times \frac{1 \text { hour }}{60 \operatorname{mins}}=25.82 \text { person } \cdot \text { hour } / \text { day }$ |
| Estimated Daily Cost | $\frac{25.82 \text { person } \cdot \text { hour }}{\text { day }} \times \frac{\$ 14.10}{\text { person } \cdot \text { hour }}=\$ 364.06 / \text { day }$ |
| Delay Cost Over Life of Bridge (assume 50 years) | $\frac{\$ 364.06}{\text { day }} \times \frac{260 \text { work days }}{\text { year }} \times 50 \text { years }=\$ 4,732,780$ |

TABLE 2: Estimated Cost of Delay for an At-Grade Rail Crossing of Canadian National Railway

## DESIGN

## Alternative Tower Terrace Road Alignment for Canadian National Railway Crossing

The City of Robins requested analyzing an alternative, straight alignment of Tower Terrace Road at the crossing of the Canadian National Railway. As shown in Figure 10, the alignment from the 2010 Plan curved Tower Terrace Road north, away from the Grey Fox Drive neighborhood. The curved alignment also creates more separation between Tower Terrace Road and the Grey Fox Drive neighborhood. The existing land along the proposed Tower Terrace Road in the vicinity of the railroad crossing is planned for residential development. The residential development expected here (single-family homes) is less likely to generate the tax revenues needed to recapture


FIGURE 10: Tower Terrace Road Alternative Alignment at Railroad Crossing; Aerial: Linn County, 2018 the costs of the railroad overpass structure. This places a large financial burden for a key piece of the corridor on the smallest community.

The analysis of a straight alignment of Tower Terrace Road places the road along the common city limit line between Robins and Cedar Rapids (the north line of the houses along Fox Trail Place). Figure 10 shows a heavy red line representing the alternative Tower Terrace Road alignment.

For the railroad overpass, Tower Terrace Road must be elevated approximately 26 feet to provide proper clearance over the tracks. As such, a retaining wall is necessary to prevent the grading of Tower Terrace Road from encroaching on the backyards and homes on Fox Trail Place. A conceptual before and after picture of what the wall might look like in backyards is shown in Figure 11.

Figure 11 is at a location approximately 300 feet east of the railroad crossing. At this house, the wall would be approximately 17 feet high and near the rear property line of the house. Although decorative treatment could be applied to the wall, it is unlikely to be a desirable feature along the backyards of the houses. The two houses immediately west of this house would have taller walls, as high as 26 feet, in the backyard.


FIGURE 11: Before/After Rendering of Straight Alignment along Fox Trail Place in Cedar Rapids, 2018

A construction cost comparison was performed for the current alignment (as shown on Sheet D. 09 and D. 10 in the Appendix) and the alternative straight alignment (depicted in Table 3) to estimate the cost differential between the two options.

Table 3 summarizes the major cost differences. Because the straight alignment will cross the railroad at a skew, the length of the bridge over the railroad will be longer. There will be less earthwork with the straight alignment since it will require a retaining wall along the houses on Fox Trail Place. However, the straight alignment will require a substantial retaining wall with a decorative treatment. The straight alignment is slightly shorter, so there will be less PCC pavement than the curved alignment. The straight alignment does not require additional right-of-way acquisition, whereas the curved alignment does. The right-ofway costs will be less with the straight alignment because there would be no need to purchase inaccessible land between the backyards on Fox Trail Place and the curved alignment of Tower Terrace Road.

Assuming 80\% swap participation, from Table 3, Robins' share of the current alignment option would be about twenty percent $(20 \%)$ of the $\$ 3,076,000$ or $\$ 615,200$. (Note - this analysis is comparing two alternatives only and is not indicative of total project costs for this area.)

Under the straight alignment alternative, the project cost is substantially higher than the current alignment, at \$4,225,000.
It should be noted that some cost is allocated to the straight alignment alternative to cover temporary construction easements and some physical damages, such as trees, fences, etc., that would likely occur in the backyards of the houses along Fox Trail Place. Additionally, no estimate was made for the aesthetic effect of the wall on the value of the houses or the anticipated negative reaction from those residents. Costs would likely increase due to condemnations being required to obtain the necessary easements, and such costs are extremely difficult to determine.

Because of the heavy impact of the straight alignment on the Fox Trail Place homes, the cost increase to the overall project, and the insignificant change in the cost share for the City of Robins, the straight alignment is not recommended.

| CONSTRUCTION COST COMPARISON: <br> ALTERNATIVE ALIGNMENT AT RAILROAD |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: |
| COST CRITERIA | CURVED ALIGNMENT <br> (CURRENT DESIGN) |  | STRAIGHT ALIGNMENT <br> (DESIGN ALTERNATIVE) |  |
| Canadian National <br> Railway Bridge | $\$$ | $2,300,000$ | $\$$ | $2,750,000$ |
| Earthwork | $\$$ | 610,000 | $\$$ | 300,000 |
| Retaining Wall | $\$$ | - | $\$$ | $1,050,000$ |
| Granular Wall Backfill | $\$$ | - | $\$$ | 100,000 |
| PCC Pavement | $\$$ | 16,000 | $\$$ | - |
| Right-of-way | $\$$ | $3,076,000$ | $\$$ | 25,000 |
| Relative Cost Difference | $\$$ | $\$, 225,000$ |  |  |

TABLE 3: Construction Cost Comparison: Alternative Tower Terrace Road Alignment at Canadian National Railway

## DESIGN ELEMENTS

This section reviews the design criteria.

| TOWER TERRACE ROAD DESIGN GUIDE UPDATE |  |
| :--- | :--- |
| CROSS SECTION ELEMENT | MINIMUM |
| Design Speed/Posted Speed, mph | $40 / 35$ (Cedar Rapids may post at 40 mph) |
| Right of Way, ft | 120 |
| Access Spacing: |  |
| Full Access, ft | 1,320 |
| Partial Access (Right-in \& out/Left-in), ft | 600 |
| Travel Lane Width: |  |
| Outside Lane, ft | 11 |
| Additional Thru Lanes, ft | 11 |
| Two-Way Left Turn Lanes, ft | 11 |
| Curb and Gutter Width, ft | 2 |
| Trail Width, ft | 10 |
| Bike Lane Width, ft (To back of curb) | 7 (Bike lane eliminated at full build) |
| Vertical Alignment: |  |
| Curve Length, ft | 120 |
| Crest K | 44 |
| Sag K | 64 |
| Maximum Gradient, Percent | 6 |
| Minimum Gradient, Percent | 0.5 |
| Horizontal Alignment (Radius), ft | 675 |
| Stopping Sight Distance, ft | 305 |
| Vertical Clearance, ft | 22 (Refer to CN grade separation requirements |
| Clear Zone: | 7 |
| Roadway, ft | 3 |
| Trail, ft | 3 |
| Object Setback, ft (To back of curb) | 3 |
| Bridge Width, ft | 84 |
| *Clear zone is measured from the edge of gutter to allow for full build traffic lane to occupy the |  |
| existing bike lane. Likewise, the median side clear zone should be measured from the full build |  |
| edge of the traveled way. |  |

TABLE 4: Tower Terrace Road Design Guide Update

## DESIGN



FIGURE 12: Tower Terrace Road, near 10th Street in Marion; Aerial: Linn County, 2018

## Design Speed

Because a substantial portion of the Tower Terrace Road corridor has been planned for decades, land development and platting has defined the general alignment of the corridor in a straight line. With relatively flat grades, it is likely that motorists may drive above the speed limits.

In order to encourage lower speeds, curvature can be added to the roadway. Minor horizontal alignment modifications can be incorporated into the corridor to increase the horizontal curvature of the roadway, similar to what was done in the City of Marion immediately west of North 10th Street (see Figures 12 and 13).


FIGURE 13: Tower Terrace Road, looking West at 10th Street in Marion, 2018

Similarly, vertical curvature can be added to reduce the length of the corridor that can be seen by a driver at any given point while still providing stopping and intersection sight distances. Sight distance limited to meet the design criteria maintains a safe operational speed by limiting the distance visualized by motorists.

Even with these design adjustments, drivers may still exceed the speed limit. The City of Cedar Rapids considered designing the corridor for 45 mph , which may be the observed speeds when Tower Terrace Road is completed. However, with a 45 or 50 mph design speed, clear zone requirements would increase from the current 7 feet to between 16 and 20 feet. This would prevent any fixtures or amenities in the median or along the parkway between the curb and trail, such as street lighting and trees. Therefore, the recommendation is that the design speed remains at 40 mph with the option of posting the speed limit at 40 mph or 35 mph .


FIGURE 14: Estimated 2040 Traffic Volume Along Project Corridor; Sources: Corridor MPO Traffic Model and Iowa DOT Draft Interchange Justification Report (IJR) Traffic Projections

## Traffic

Forecasted 2040 traffic volumes on Tower Terrace Road range from approximately 11,000 vehicles per day (near IA Highway 13) to nearly 30,000 vehicles per day at I-380. The bulk of the corridor (generally from North Center Point Road east to IA Highway 13) is approximately 7,500 vehicles per day to 15,000 vehicles per day.

The lowa DOT is considering, and will likely build, a diverging diamond interchange (DDI) at Tower Terrace Road on I-380. Additional travel lanes near the interchange may need to be added to accommodate the DDI. Traffic volumes through the interchange are predicted to be in the upper 28,000 to 30,000 vehicle per day range, which would normally require two through traffic lanes each way plus turn lanes. Figure 14 is the estimated 2040 traffic volumes along the project corridor based on a synthesis of projections from the available Corridor MPO Traffic Demand Model and the lowa DOT draft Interchange Justification Report (IJR) traffic projections.

## Complete Streets

The jurisdictions involved in planning Tower Terrace Road have been advocating Complete Streets policies for several years. Complete Streets are defined as transportation facilities that include safe, attractive, and comfortable access and travel for all anticipated modes of travel. This would typically include accommodations for vehicular traffic, bicyclists (recreational and commuter), pedestrians, (including recreational and fitness users like in-line skaters, runners, walkers and families), and transit.


Tower Terrace Road is envisioned to fully comply with the idea of a complete street. The plans currently include bicycle accommodations in the initial build, with bike lanes and separate trails, as well as accommodations of transit operations.

## DESIGN

## Green Street

The concept of a green street carries two meanings: One is a street that includes tree plantings and other plant materials to create a greener roadway in terms of appearance. The other meaning intends that sustainable design practices be included in the design of the roadway to lessen its environmental impact. Both of these meanings apply to Tower Terrace Road (see Figure 15).

Sustainable design elements are appropriate for Tower Terrace Road as long as they are very carefully considered. Typical sustainable design practices include rain gardens and bioswales for the treatment of storm water runoff. The intent of these measures is to allow rainfall to infiltrate the ground through soil, rather than having the stormwater travel through storm sewers or ditches directly into streams and other waterways. Additionally, rain gardens and bioswales act as filters for stormwater: stormwater picks up pollutants on rooftops and hard surfaces and the rain garden allows these pollutants to be filtered out naturally (see Figure 16).

Smaller bioswales could be included in the median design, particularly where significant amounts of stormwater runoff are not expected. It is important for safety reasons that storm water runoff be removed from the pavement of Tower Terrace Road quickly and efficiently so water does not spread into travel lanes, making travel difficult.

Larger stormwater management areas should be located adjacent to Tower Terrace Road in areas such as:

- Existing floodplains around Dry Creek
- Low areas and sinkhole areas (Council Street through C Avenue)
- Excess right-of-way at the northwest corner of C Avenue and Tower Terrace Road (E. Main Street)
- Low areas and wetlands immediately east of Meadowknolls
- Low area at Christopher Creek immediately west of Newcastle Road
- Low areas on City of Marion property on the east side of Indian Creek
- Drainageway crossings in existing farm fields west of Highway 13

Many of these areas could incorporate minor detention and bioswale facilities to offset some of the increased runoff due to the added impervious area created by Tower Terrace Road (see Figure 17).


FIGURE 15: Green Street at Collins Road in Cedar Rapids, 2018


FIGURE 16: Bioswale in Noelridge Park in Cedar Rapids, 2018


FIGURE 17: Detention Basin at Lindale Mall and First Avenue in Cedar Rapids, 2018

## DESIGN

## Access Spacing

The original plan specified full access points at no closer than 1,320 feet (every quarter of a mile) and partial access (right-in/right-out/left turn-in) at 600 feet. Those access spacing dimensions are closer on some of the existing sections of Tower Terrace Road. It has been decided to maintain the stated access spacing to limit the number of intersection conflict points. This helps to promote the future efficiency of the corridor once the surrounding area is fully developed.

## Durable Pavement Markings

Pavement markings provide traffic control and guidance for road users (drivers, bicyclists, pedestrians) and include lines, symbols, and words to convey the intended use of the pavement area. Most pavement markings are reflective for visibility during the day, night, and under wet conditions. Once pavement markings are installed on a roadway, the responsible jurisdiction (state, city, or county) must maintain the markings so they are effective in controlling traffic. Over time, all pavement markings fade or are worn off by traffic, or lose their reflectivity and are not effective at night or under adverse weather. To reapply pavement markings not only has a labor and material cost, but also a safety cost to striping crews and the general public as workers must be present in traffic to reapply the markings. (See Appendix for Durable Pavement Markings Lifespan). As such, the long-term savings of durable pavement markings outweigh the higher initial construction cost, and durable pavement markings should be used on Tower Terrace Road projects. Maintenance methods will be at local jurisdiction discretion.

## Curb and Gutter

Curb and gutter widths are 2 feet from the back of curb to the edge of the gutter pan. On the median side (opposite of the bike lane), the design is to use an 11 -foot wide travel lane and 2 -foot curb and gutter to provide additional width for the clear zone for median amenities, such as trees and street lights.

## Trees

Trees are strongly encouraged in the medians and in the parkway. While ornamental trees can be used depending on the context of a given location, the preference is to plant deciduous shade trees in a variety of species including oaks, maples, walnuts, coffee trees, and so forth. Each community may have a list of specific species they encourage. Currently, with the infestation of Emerald Ash Borer, ash trees are not recommended. Elm trees could be considered if they are resistant to Dutch Elm disease.

Trees provide shade for pedestrians and trail users while adding character to the corridor. As they mature, they help block street light pollution onto private property and help slow traffic by providing an enclosed feeling to the roadway. Also, trees bring an element of side friction to the roadway, encouraging slower speeds. The proximity of plant materials to the roadway must comply with clear zone requirements and not obstruct drivers' safe distance vision, particularly at intersections. However, keeping the materials as close to the roadway as possible helps communicate a feeling of speed even though vehicles may be traveling slower (see Figure 18).

## Trail Width

The original plan trail width of 10 feet will be maintained and a trail will be present on both the north and south sides of Tower Terrace Road (see Figure 19). Trails will not be on the north and south sides of the roadway through the I-380 interchange. Whether trails are carried on both sides of the bridges over Dry Creek, Indian Creek, and the Canadian National Railway should be determined as part of the detailed project design.


FIGURE 19: Trail Width

## Bike Lanes

Current AASHTO design guidelines indicate that the minimum bike lane width is 5 feet. Therefore, a 7 -foot total width is recommended, which includes a 5 -foot ridable space and a 2 -foot curb and gutter. Care must be taken with storm water intake design to ensure any grates in the gutter pan are bicycle rated and any curb opening intakes do not extend into the bike lane.

## Sidewalk Width

Because both sides of Tower Terrace Road will have 10-foot wide trails, no sidewalks will be constructed along Tower Terrace Road. Side street sidewalk widths will be constructed to the requirements of each jurisdiction.


FIGURE 20: Tower Terrace Road, near 35th Street in Marion, 2018

## Roadway/Pedestrian Crossings

Analysis and best practices for traffic and design should be used for crossing Tower Terrace Road. For instance, where crossings are present, careful consideration should be given to at-grade, at-grade signalized, or grade-separated crossings. Crossings at the I-380 and Tower Terrace Road interchange were under design by the lowa DOT at the time of this update. At the time of this update, at-grade, signalized crossings have been decided for the crossings at this location.

## Crest Vertical Curve K

The " $K$ " value for a vertical curve describes how sharp a hill or valley in a roadway alignment is constructed. Smaller K values correspond to sharper peaks (crests) and valleys (sags). As discussed previously in the Design Speed section, the desirable Crest Vertical Curve K was reduced from 70 in the original plan to the minimum value of 44 . This reduction is recommended to limit the field of view of motorists, which will reduce motorists exceeding the speed limit. The crest vertical curves need to be designed to provide intersection sight distance. Therefore, the designer of the roadway may exceed the stated value on a case-by-case basis in order to provide the necessary operational safety.

## Clear Zone

The minimum roadway clear zone was reduced from the original plan value of 10 feet to 7 feet based on SUDAS. As discussed in Table 4, the minimum clear zone width must be measured from the edge of traveled way under full build conditions to avoid placing objects, such as trees and lighting, within the final clear zone swath (see Figure 21).

## Horizontal Alignment (Radius)

Similar to the crest vertical curvature, the desirable horizontal curve value was reduced to the minimum radius of 675 feet to limit drivers' field of view to help discourage speeding. There is one location, based on the concept layout completed with this update, in which the end of constructed Tower Terrace Road on the west side of Indian Creek is so close to the proposed bridge location that a tighter than minimum radius will likely be needed (see Figure 22 and Sheet D. 23 in Appendix). This is needed to transition between the existing Tower Terrace Road and the bridge to avoid replacing


FIGURE 21: Clear Zone for Initial Build (top) and Full Build (bottom)


FIGURE 22: Tower Terrace Road, near Winslow Road in Marion, 2018

## DESIGN



FIGURE 23: Tower Terrace Road Bidge over Indian Creek and Dry Creek
some or all of the intersection of Tower Terrace Road with relocated Winslow Road. In this case, a 510-foot radius did provide a tight enough curve to avoid changing the existing intersection. This radius conforms to the SUDAS minimum radius for a 35 mph design speed. It is possible during the actual design, using survey data, that a larger radius might be employed.

## Bridge Width

The concept plans provided by the jurisdictions and the original Tower Terrace Road Corridor Management Plan all show bridge widths at approximately 72 feet.

The actual bridge widths are more likely to be between 80 feet and 90 feet with trails on both sides of the bridge. With four traffic lanes, plus 3-foot shoulders to the edge of the concrete barrier (which is 1.5 feet wide), plus the trail, plus 2 feet of clearance on either side of the trail between the concrete barriers, and a final concrete barrier on the outside adds up to 84 feet with 11-foot wide traffic lanes (see Figure 23). The bridge will be built to accommodate 4 lanes of travel in the future, but will be striped for 2 lanes of travel including bike lanes and a painted median until Tower Terrace Road is expanded to 4 lanes.

## FUTURE ADDRESSING

The County addresses on a South to North and West to East numerical grid. When addressing near a city boundary, efforts are made to match the addressing system that the particular city is using. A consistent, easy to find address location system is recommended for emergency services. One option would be to draft a numbering system for the entire Tower Terrace Road corridor and send this system to the appropriate contact for emergency services for each jurisdiction to review. This would create a more uniform system.


FIGURE 24: Indian Creek in Marion, 2010

## DESIGN

## TYPICAL SECTIONS

The original corridor plan shows 6.5 -foot wide bike lanes on either side of Tower Terrace Road, both in the near-term construction and for the ultimate widening of Tower Terrace Road to a four-lane roadway at full build. The corridor was also envisioned with a 10 -foot wide trail on the north side and 6 -foot wide sidewalk on the south side. As part of the update process, a fundamental change emerged in the typical section of Tower Terrace Road. For the initial build, bike lanes would be included in the roadway, whereas in the long-term, full build out the roadway would not include bike lanes.

Before full build, a minimum paved width of 20 feet is necessary to allow emergency vehicle access to pass a stalled vehicle or other obstruction. Therefore, the pavement was segregated into a 11 -foot wide lane, 2 -foot wide curb and gutter at the median, and a 7 -foot wide bicycle lane (including curb and gutter width). Long-term, the pavement would be widened into the median to provide an additional through lane. The original plan shows bike lanes in the full build out.

It is anticipated that the long-term need for bike lanes is not necessary, especially with the presence of a trail on both sides of the roadway. Analysis of the existing and planned land use along the corridor shows approximately two-thirds of the corridor is, or will be, developed as residential, as shown in Figure 25 (see Future Land Use Map in Appendix). Having a trail only on the north side of Tower Terrace Road will require trail users on the south side of the road to cross the road to gain access to the trail, creating an unsafe situation and leading to conflicts with pedestrians on the paved trail.

A better solution is to put 10-foot wide trails on both sides of Tower Terrace Road, and under the future conditions, repurpose the bike lane pavement (which will still be needed in the partial build out to provide the 20 -foot wide emergency access pavement) into a vehicle traffic lane and only widen 6 feet toward the interior of the median. The 20 -foot wide pavement built in the short-term would be widened to 26 feet wide, consisting of two


FIGURE 25: Future Land Use Chart 11 -foot wide lanes and two 2 -foot wide curbs and gutters.

The original and revised typical sections for the initial build are shown in Figure 26, located on page 34.

The original and revised typical sections for the full build are shown in Figure 27, located on page 35.

## DESIGN

## INITIAL BUILD



FIGURE 26: Tower Terrace Road Updated (top) and Original (bottom) Typical Sections for the Initial Build


FIGURE 27: Tower Terrace Road Updated (top) and Original (bottom) Typical Sections for the Full Build


FIGURE 28: Three-Dimensional Rendering of Updated Initial Build
An advantage of this change includes less overall pavement. The 6 -foot wide sidewalk is converted to a 10 -foot wide trail, and in exchange, the original design 32-foot wide pavement section is reduced to 26 feet (a savings of 6 feet of pavement in each direction for a total of 12 feet). Over the length of the project (about 44,000 feet, or 8.3 miles, long), nearly 60,000 square yards of concrete pavement and base material saved, which is roughly $\$ 2.9$ million that will be saved when widening Tower Terrace Road to its full, four-lane width.

Another advantage of collective changes to the typical cross sections is the improved safety and user accommodation of having a trail on both sides of Tower Terrace Road. Trails on both sides reduces the need for trail users to cross Tower Terrace Road or ride alongside pedestrians on a narrower sidewalk.

A three-dimensional rendering of the new typical section showing initial build ( 20 -foot wide paving) is shown in Figure 28. The rendering shows a representation of pollinator habitat in the median, as well as a depressed median for the accommodation of storm water infiltration beds, bioswales, and other storm water best management practices. These treatments were touched on in the original plan and the designer should look for opportunities to incorporate these practices (as well as other best practices) into the design. The rendering also shows typical placement of underground utility elements, such as storm sewer (green), water main (blue), gas (yellow), and the other utilities (power and communications).

Other different, typical sections will need to be employed for certain areas along the corridor's alignment. These other typical sections differ from the revised overall typical section for Tower Terrace Road. For example, on Tower Terrace Road between North Center Point Road and Robins Road, the existing two-lane concrete pavement is in reasonably good shape and will likely provide good service for at least 20 more years. The representatives from the City of Hiawatha requested that section of Tower Terrace Road incorporate the existing pavement into the project, at least for the short-term design. Other typical sections are through the bridges and between the bridges over Dry Creek and Canadian National Railway.

The following page shows Figure 29, which depicts a series of typical sections for Tower Terrace Road, and Council Street, along with a map identifying the locations marked in yellow associated with each typical section.

## DESIGN




INITIAL BUILD, WIDENING AT INTERSECTIONS


INITIAL BUILD, WIDEN EXISTING


INITIAL BUILD, BETWEEN BRIDGES


INITIAL AND FULL BUILD, COUNCIL STREET


INITIAL BUILD, BRIDGE SECTION


FIGURE 29: A Series of Typical Sections for Tower Terrace Road

The typical section for Council Street includes bicycle lanes, similar to Tower Terrace Road. In general, each major roadway crossed by Tower Terrace Road is improved to a minimum three-lane section (one through lane in each direction and a center left turn bay). According to the City of Cedar Rapids Trails Master Plan, C Avenue is listed as having on-street bicycle accommodations. Council Street is also identified in the master plan, and connects the Dry Creek Trail and the Tower Terrace Trail and is a major arterial through densely populated neighborhoods. Therefore, Council Street was laid out with additional width to accommodate bicycle lanes. Many of the other major streets could include bicycle lanes or accommodations at the discretion of each jurisdiction.

## MEDIAN TREATMENTS

There are many options for planting treatments in medians along the Tower Terrace Road corridor. In the City of Marion, most of their sections have been constructed with turf grasses, also called bluegrass, in the median. The construction of Tower Terrace Road provides a unique opportunity to include native plant species that would promote pollinator habitats. This opportunity is in line with Linn County efforts to create 10,000 acres of new pollinator habitat by repurposing land currently mowed or sprayed. Many plant species native to lowa, including wildflowers such as the Black Eyed-Susan and Butterfly Milkweed, have benefits that would:

- Result in less overall maintenance regarding mowing and watering,
- Result in higher chance of successful establishment of plants since these species are native to lowa,
- Promote beneficial insects,
- Work well in bioswale applications,
- Provide a pleasant aesthetic, and
- Result in approximately 15 acres of pollinator habitat.

Under full future widening conditions, with a 16 -foot wide median, and 14 feet of parkway on either side, simply planting the median in native species would result in between $30 \%$ and $40 \%$ of the corridor being planted in pollinator habitat. This alone would achieve the goal set for the corridor. However, there are several areas where uneconomic remnants of private land will need to be acquired, such as around the Dry Creek and Canadian National Railway bridge crossings and the section between Barnsley Lane and Newcastle Road, (see Sheets D. 09 and Sheets D. 17 and D. 18 in the Appendix) where additional acres of land could be added to the pollinator habitat.


FIGURE 30: Various Median Treatment Examples from Corridor MPO Area, 2018

## MEDIAN PLANTINGS: POSSIBLE CONCERNS AND BENEFITS

## Possible Concerns:

- Salt tolerance near the curb line Maintenance expectations
- Native grasses still need spot mowing, spraying, trash removal, and periodic burning
- Native grasses can be highly flammable
- If both trees and native plantings are desired in the median, trees right next to native plants should be burn tolerant


## Possible Benefits:

- Aesthetics
- Environmental considerations
- Pollinator mixes in line with state and regional goals
- Less maintenance than cool season grasses
- Less exposure of staff to traffic

More drought resistant and evolved to lowa's climate

## DESIGN

Other median treatments, particularly where the median is 4 -feet wide, would include hardscape options, such as brick or stained/colored concrete. At wider locations (and in the center of roundabouts) art may be an option. Figure 31 is from a location in the City of Marion depicting a median nose treatment of colored concrete.

Another example from the City of Marion, Figure 32, is a combination of sculpture art and landscaping (primarily day lilies) in the roundabout median at the intersection of Tower Terrace Road and 35th Street.

## STREET LIGHTING

Street lighting in this plan is centered primarily on the preferences of each jurisdiction. Jurisdictions may light the corridor from the parkway (between the outside curbs and the trails) or from the median. Figure 33 shows the two different lighting configurations, side-by-side, on a section of Tower Terrace Road. The yellow and red shading represents the more intense light (yellow) at the light pole location, fading to less intense light (red) as distance from the light source is increased. Both lighting schemes spill light from the right-of-way onto private property. Lighting from the median tends to spill less intense light more uniformly across private property. Lighting from the parkway tends to throw most of the light toward the street but spills more intense light onto private property, generally confined to the vicinity of the light pole.

As trees planted along the parkway mature, the lighting patterns will encounter more interference from tree canopy (particularly in the


FIGURE 31: Median Nose Treatment, 29th Avenue near Indian Creek Bridge in Marion, 2018


FIGURE 32: Roundabout Sculpture Art and Landscaping, Tower Terrace Road and 35th Street in Marion, 2018 growing season), which will shade light spillage from the median. On the other hand, lighting from the median may also require pedestrian-level lighting along the trails if tree canopy shades the trail from the median street lights.

Both lighting schemes can be designed to work. In fact, depending on the design or look of the street lighting, different lighting schemes might help separate and identify to the road users when one has crossed from one jurisdiction into another.


FIGURE 33: Two Side-by-Side Lighting Comparisons

## DESIGN

## INTERSECTION TREATMENTS

As part of this plan update, several intersections were specifically identified as definite locations for roundabouts, as opposed to signalized intersections (see Figure 34 and Table 5). These locations were selected because: the municipality preferred a roundabout treatment, a traffic study was completed recommending a roundabout, or space was available such that a roudabout could be an economically competitive solution. Additional locations could be considered based on the available space. Under all circumstances, a detailed traffic analysis should be performed at each intersection to determine the best intersection traffic control treatment.

For the Tower Terrace Road corridor, the main criteria for a roundabout location is the traffic analysis performed as part of the detailed design. Roundabouts have many benefits and advantages over traffic signals. However, they do not have the flexibility to change operations based on changing traffic volumes such as can be done with traffic signal phasing, sequencing, and timing. Any of the intersections along the corridor could potentially be served by a roundabout. However, a careful analysis of anticipated traffic flows should be done, particularly analyzing heavy left turn movements that can prevent other legs of the roundabout from entering and thereby causing long queues.


FIGURE 34: Roundabout Locations on Tower Terrace Road

| ROUNDABOUT LOCATIONS ON TOWER TERRACE ROAD |  |
| :--- | :--- |
| LOCATION | COMMENT |
| Edgewood Road | Identified by City of Cedar Rapids |
| North Center Point Road | Consider due to close proximity of I-380 interchange. <br> Identified by City of Hiawatha |
| Robins Road | Identified by City of Hiawatha |
| Council Street | Identified by City of Cedar Rapids |
| C Avenue NE | Study completed under existing design contract <br> recommends roundabout |
| Relocated East Robins Road | Concern with queuing between C Avenue and relocated <br> East Robins Road |
| Barnsley Lane | Identified by City of Marion |
| 44th Street (Extension) | Identified by City of Marion |

TABLE 5: Potential Roundabout Locations on Tower Terrace Road

## UTILITY ACCOMMODATION

Tower Terrace Road may become a desirable corridor for utility companies to locate their lines to provide service to new development, and close or loop networks of their facilities. It is important to consider the spatial needs for both public and private utilities in the development of the roadway cross section. Possible utility locations have been identified on the cross sections shown previously in Figure 28. These locations are similar to the typical locations set in the lowa SUDAS standards. If desirable, public utility easement located outside of the roadway right-of-way can be provided for these utilities.

Most of the proposed Tower Terrace Road corridor is through undeveloped properties. As such, utility conflicts are expected to be limited in those segments. Public and private utilities will likely be extended along the corridor as part of construction (in the case of storm sewer and water) or after construction and often tied to development of the adjacent land (sanitary sewer, power, communications, gas, etc.).

There are some exceptions along the existing alignment of Tower Terrace Road from Edgewood Road to Robins Road, where existing utilities are present. From a visual review in the field, this segment contains all of the typical utilities including: overhead primary power, water main, sanitary sewer, gas, and communications.

It is likely many of these utilities will need adjustment at the least, and more likely relocation as part of the project. Coordinating utility adjustments and relocation is a normal but critically important part of any design project. Utility relocations take approximately a year from initial notification of the utility of a project through the actual relocation of the facilities. Much of this work can occur simultaneously with other design-related activities. However, it is crucial to relocate utilities ahead of roadway construction to avoid costly delays of construction and prolonged project schedules.

Discussion with the jurisdictions concerning overhead power generally included moving overhead utilities underground. Normally, overhead utilities located in the public right-of-way that are required to move as part of the roadway construction project must do so at the utility owner's expense. However, the additional cost to upgrade to an underground utility is typically borne by the jurisdiction funding the roadway project. The following is a summary of the community positions:

- The City of Cedar Rapids has relocated overhead utilities underground on several major corridors in the City.
- The City of Marion has been constructing Tower Terrace Road without overhead utilities.
- The City of Robins has indicated they are not interested in paying the additional cost to move utilities underground.
- The City of Hiawatha is interested in moving overhead utilities underground on this corridor.

Another utility conflict are the ITC overhead primary power lines along Dry Creek. It is anticipated the vertical alignment of Tower Terrace Road will require the overhead lines to be raised to provide the minimum 16 feet of vertical clearance over the roadway. The existing high voltage steel towers are custom designed, therefore this adjustment includes significant costs. It is anticipated, based on similar project experience by the consultant, that the utility relocation would cost approximately $\$ 500,000$.

## OVERVIEW

The funding of Tower Terrace Road does not have to only be local or federal sources; however, the conditions of funding through the Corridor MPO require many of the federal aid processes still be followed (Refer to the Funding section of this update starting on page 47). As such, each section of Tower Terrace Road that utilizes federal aid or swap funds must undergo an environmental review process to ensure the projects comply with National Environmental Policy Act (NEPA) requirements. NEPA requirements include an evaluation of project impacts to:

- Wetlands
- Farmland
- Historic Structures
- Cultural Resources (archaeological and other)
- Endangered Species
- Noise
- Traffic
- Other environmental issues

These environmental reviews must be conducted from one logical terminus to another, which means the study area must connect to something of regional significance on both ends. Once a section is cleared environmentally, the roadway project within that region can be constructed in phases.

It is more beneficial to do environmental review on each section of Tower Terrace Road, rather than performing one large overall review of the corridor. Environmental clearances have a shelf life of a few years before they have to be revisited. Performing one large overall environmental review to clear the entire corridor from I-380 to Highway 13 is not practical, or ultimately useful. If one large review was done, then the environmental clearance would expire before some sections of the project became funded.

In order to be implementable, the corridor has been broken down into sections for environmental review. As described later in this update, each environmental section contains sub-phases of construction projects. Figure 36 and Table 6, on the next page, show an overall corridor map broken down into environmental review sections, and a list of projects within each associated region. It should be noted the projects are numbered and sorted by west to east orientation. The order and number assigned to each project phase on this list does not indicate priority of implementation.

As can be seen in the list on Table 6, the lowa DOT is preparing their own environmental review of the I-380 interchange. As part of that effort, much of the data and analyses within Region A can be obtained from the lowa DOT and used by the Cities of Cedar Rapids and Hiawatha for their use in obtaining environmental review clearances for Projects 1 and 2.

Projects $8,9,10$, and 11 are nearly complete with their environmental review. Right-of-way acquisition is scheduled to begin later in 2018.

In each environmental review section, the construction limits for each project phase were based on the following criteria:

- Construction cost around $\$ 5$ million, except for the bridge projects
- Known project limits (e.g., around I-380, between C Avenue and Alburnett Road, etc.)
- Convenient starting and stopping points (e.g., grades are close to existing and can be matched in); attempted to balance the earthwork on a project
- Property ownership on undeveloped parcels/development-driven projects


## PROJECTS



FIGURE 36: Overall Tower Terrace Road Environmental Review Region Map

| CONSTRUCTION PROJECT LIMITS |  |  |
| :---: | :--- | :--- |
| PROJECT NO. | PROJECT LIMITS | ENVIRONMENTAL STUDY REGION |
| A.1 | Edgewood Road to W. edge of I-380 Interchange | A |
| - | I-380 Interchange (By lowa DOT) | Independent Study by lowa DOT |
| A.2 | E. Edge of I-380 Interchange to Center Point Road | A |
| B.1 | Center Point Road to Stamy Road | B |
| B.2 | Stamy Road to Robins Road | B |
| C.1 | Robins Road to Council Street (Bridges Over Dry <br> Creek and Canadian National Railway) | C |
| D.1 | Council Street to Turtle Run Extended | D |
| D.2 | Turtle Run Extended to Summerset Extended | D |
| D.3 | Summerset Extended to C Avenue | D |
| E.1 | C Avenue to 900 Feet East of Meadowknolls Road | E |
| E.2 | 9o0 Feet East of Meadowknolls Road to 1/4 Mile West <br> of Alburnett Road | E |
| E.3 | 1/4 Mile West of Alburnett Road | E |
| - | Alburnett Road to Relocated Winslow (Already Built) | Completed Outside Federal Aid |
| F.1 | Relocated Winslow to Existing Winslow (Bridge Over <br> Indian Creek) | F |
| - | Existing Winslow Road to E. Edge of Abode <br> Development (The Ridge at Indian Creek) - Already <br> Built or Designed/Under Construction | Completed Outside Federal Aid |
| G.1 | The Ridge at Indian Creek to One Mile West of <br> Highway 13 | G |
| G.2 | One Mile West of IA Highway 13 to IA Highway 13 | G |

TABLE 6: Overall Limits of Project Phases within Each Environmental Review Section

## PROJECTS

## COST ESTIMATES

Project costs were developed for each of the 14 project segments. Costs for these 14 project segments (see Figure 37), as well as totals, are broken down to show the cost to each jurisdiction for each project phase and overall (see Table 7). These projects are listed from west to east along Tower Terrace Road. Additionally, cost opinions are based on 2018 construction dollars and inflation is expected to cause cost increases in the future, depending on the timing of construction. A detailed cost opinion breakdown by project phase is included in the Appendix.


FIGURE 37: Overall Tower Terrace Road Project Phase Map

| PROJECT PHASE AND JURISDICTIONAL COSTS |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| PROJECT PHASE | COST |  |  |  |  |
|  | HIAWATHA | ROBINS | CEDAR RAPIDS | MARION | TOTAL |
| A. 1 |  |  | \$8,191,924 |  | \$8,191,924 |
| A. 2 | \$4,323,020 |  |  |  | \$4,323,020 |
| B. 1 | \$2,430,068 | \$1,326,448 |  |  | \$3,756,516 |
| B. 2 | \$3,873,713 | \$3,410,278 |  |  | \$7,283,991 |
| C. 1 | \$8,984,227 | \$6,756,424 | \$4,709,633 |  | \$20,450,284 |
| D. 1 |  |  | \$3,197,771 |  | \$3,197,771 |
| D. 2 |  |  | \$5,055,268 |  | \$5,055,268 |
| D. 3 |  |  | \$6,193,316 |  | \$6,193,316 |
| E. 1 |  |  | \$4,333,555 | \$1,730,520 | \$6,064,075 |
| E. 2 |  |  |  | \$6,869,100 | \$6,869,100 |
| E. 3 |  |  |  | \$2,658,631 | \$2,658,631 |
| F. 1 |  |  |  | \$12,256,385 | \$12,256,385 |
| G. 1 |  |  |  | \$5,539,875 | \$5,539,875 |
| G. 2 |  |  |  | \$5,490,576 | \$5,490,576 |
| TOTAL | \$19,611,028 | \$11,493,150 | \$31,681,467 | \$34,545,087 | \$97,330,732 |

TABLE 7: Tower Terrace Road Total Costs by Project, Jurisdiction, and Overall (2018 Dollars)

## Earthwork/Ground Disturbance

As mentioned earlier, an attempt was made to balance the earthwork on the projects to avoid excessive borrow or waste. Because the earthwork computations were created from aerial contours and are very rough, any deficit within 10,000 cubic yards was considered close enough to balanced. Therefore, the earthwork cost estimates would be close enough that in detailed design the earthwork could be reasonably balanced. There are notable exceptions at the bridges where substantial fill will be required. An approximate cost estimate of earthwork by project phase was calculated and is included in the Appendix.

## PRIORITIES

A priority implementation plan was developed for the 14 construction projects tying each to a timeline for initiation. Once each project phase is funded using federal-aid or swap, they will follow the typical schedule for development, as shown in Figure 38.


FIGURE 38: Flow Chart of a Typical Project Development Schedule After Funding is Received
It is common for a project to take up to seven years from the time design begins to the time construction begins. Right-of-way acquisition is one of the longer elements not entirely within the control of the sponsoring agency.

The following is a list of the projects in order of priority. The priorities were set first based on how close those projects already were to beginning construction. After that, the criteria encouraged beginning activities (environmental review) on the more difficult projects that will take additional time. The last priority projects were those that are likely to be driven by development, rather than connectivity. Even though those projects may not occur for a while, a development proposal may move a project up in the priority list for a given community. Additionally, development projects may further subdivide the previously listed projects into phases.

The following page includes Figure 39 and Table 8, which provides recommended construction project priorities.


FIGURE 39: Overall Tower Terrace Road Construction Project Priorities Map

| CONSTRUCTION PROJECT PRIORITIES |  |  |  |
| :---: | :---: | :--- | :--- |
| PROJECT PHASE <br> PRIORITY | PROJECT <br> PHASE | PROJECT PHASE LIMITS | COMMENTS |
| 1 | E.3 | 1/4 Mile West of Alburnett Road | TIP Schedule 2019 Construction |
| 2 | E.2 | 900 Feet East of Meadowknolls Road to 1/4 Mile <br> West of Alburnett Road | TIP Schedule 2019 Construction |

TABLE 8: Overall Construction Project Priorites

## Project Priorities 1, 2, and 3

1/4 Mile West of Alburnett Road, 900 Feet East of Meadowknolls Road to $1 / 4$ Mile West of Alburnett Road, and C Avenue to 900 Feet East of Meadowknolls Road
These projects were selected for first priority because they are almost completely through the environmental process, have right-of-way funding programmed for acquisition in 2018/2019, and have funding for construction in place for 2020/2021.

## Project Priorities 4.1 and 4.2

I-380 Interchange, Edgewood Road to W. Edge of I-380 Interchange, and E. Edge of I-380 Interchange to Center Point Road
These projects were selected for the next round of priority since there is funding in place for part of the construction. Project Priority 4.1 (the I-380 interchange) is being managed by the lowa DOT and is planned for 2021 construction. Project Priority 4.2 might lag behind the interchange project, depending on the schedule of the environmental clearance process. As such, the schedule for these projects may slip. The key to these two projects is the environmental process.

## Project Priority 5

Robins Road to Council Street (Bridges Over Dry Creek and Canadian National Railway)
This is an expensive, difficult project with a high likelihood of environmental issues and coordination with a major utility (ITC overhead power line) and coordination with Canadian National Railway. This project is vital to the corridor. Without the crossings of Dry Creek and Canadian National Railway, there is no connection to approximately three-fourths of the corridor to l-380. Therefore, this project should begin the engineering and environmental process as soon as possible because this will probably take six or more years to implement. This project would be higher in the priority list if the other projects were not already at least partially funded and substantially ahead in the environmental process.

## Project Priority 6

Relocated Winslow to Existing Winslow (Bridge Over Indian Creek)
This is the second most expensive and second most difficult project along the corridor. This project will also require additional time to develop due to the high likelihood of environmental issues surrounding Indian Creek. However, this project does have the advantage that the City of Marion owns much of the land needed to construct the improvements. Assembling the funds for this project and initiating the environmental process will be important to maintain this project schedule.

## Project Priority 7 through 11

Summerset Extended to C Avenue, The Ridge at Indian Creek to One Mile West of Highway 13, One Mile West of IA Highway 13 to IA Highway 13, Council Street to Turtle Run Extended, and Turtle Run Extended to Summerset Extended
These projects will likely occur as development occurs along the corridor. For example, Project Priority 7 (from Summerset to C Avenue) will be tied primarily to the development of a Hy-Vee site at the southwest corner of C Avenue and Tower Terrace Road.

## Project Priority 12 and 13

Center Point Road to Stamy Road and Stamy Road to Robins Road
The City of Hiawatha has indicated a preference to use the existing Tower Terrace Road pavement since this section of Tower Terrace Road is already functional as a two-lane roadway. This roadway can do so until congestion requires widening to provide turn lanes at the intersections and the other traffic-related controls and amenities. At some point in the future, when the existing pavement is in need of replacement, this section of Tower Terrace Road can be replaced with the typical section of Tower Terrace Road.

## OVERVIEW

Each jurisdiction is primarily responsible for the construction and maintenance of Tower Terrace Road within their boundaries. The jurisdictions have external and internal funding sources (refer to the next section) to apply towards project implementation.

The project costs consist of the following main items:

## - Construction

- Right-of-way acquisition
- Utility relocations, primarily undergrounding utilities or moving utilities in private easements
- New utilities, primarily water main extensions
- Engineering (environmental studies, design, plan preparation, and bidding assistance, etc.)
- Construction administration (construction inspection and managing the construction contract)

Figure 40 shows a typical proportion of each of the above project cost categories.

As can be seen on Figure 40, the bulk of the project costs occur during construction and as much as $25 \%$ of project costs occur during the engineering, right-of-way, and other phases. In terms of funding, not all of these cost categories qualify for participation in federal aid (note that for purposes of finance discussion, the terms federal aid and swap funds will be used interchangeably). For example, building new utilities or moving overhead utilities underground would generally not be eligible for federal aid. Engineering and


FIGURE 40: Typical Proportions of Project Costs construction administration can be financed with federal aid, but the process to obtain services and make contract changes can be cumbersome and time consuming. Due to these concerns, many communities opt to use local funding for both of these items and utilize federal aid on construction and right-of-way acquisition phases of a project.

Table 9, on the following page, adds a funding scenario, assuming half of the eligible construction and right-of-way costs are funded with federal aid/swap funds.


TABLE 9: Summary of Project Costs by Project and Jurisdiction (2018 Dollars)
The summary shows approximately $\$ 37$ million in federal aid/swap funds will be applied toward Tower Terrace Road. Some of this funding has already been secured:

- Federal aid for the east and west approach legs of the Tower Terrace Road interchange (Projects 1 and 2): \$4 million
- Swap funds for Tower Terrace Road from C Avenue to Alburnett Road (Projects 8, 9, 10, and 11): \$11.9 million

Based on the above allocations already in place, there would remain about $\$ 20$ million in swap funds to be allocated using the Corridor MPO's annual allocations. Currently, the Corridor MPO receives approximately $\$ 5.5$ million per year. If $\$ 2.5$ million per year were allocated toward Tower Terrace Road, the balance could be attained in about 8 to 12 years, leaving some room for inflation.

It is important to note that the unfunded balance of local funds totals approximately $\$ 58$ million. Currently, the above summary shows only the municipal jurisdictions. To help solve this, Linn County could also participate in some fashion. For example, if the $\$ 58$ million could be divided in five ways, this would result in just under $\$ 12$ million per jurisdiction. Perhaps Linn County could participate up to $\$ 12$ million to be distributed evenly to the other four municipalities ( $\$ 3$ million each). Alternatively, the distribution could be prorated based on need.

For example, because Robins is a relatively small community, and the access benefits of Tower Terrace Road are limited essentially to the area west of the Canadian National Railway, the value the City of Robins receives is less considering the high cost of the infrastructure to cross the railroad. One scenario could apply $\$ 5$ million toward Robins local share and split the remaining $\$ 7$ million to the other three municipalities. The City of Robins is in support of this option.

A large project underway for Tower Terrance Road is the I-380 and Tower Terrace Road interchange, which will be funded by the lowa DOT. Design of the interchange was underway at the time of this update by the lowa DOT and their consultants and is planned as a diverging diamond interchange.

## ALTERNATIVE FUNDING SOURCES

Alternative funding sources do exist and there are a few funding sources available to counties and municipalities. These include both federal and non-federal sources.

Federal aid sources include:

- Iowa Clean Air Attainment Program (ICAAP): Funding is usually in the $\$ 0.5-\$ 1$ million range
- BUILD Grant: Funding ranges from $\$ 5$ million (at a minimum) to $\$ 25$ million (maximum)

The Iowa Clean Air Attainment Program (ICAAP) is federal funding but in most instances, is now being substituted by the lowa DOT for swap funds.

The Better Utilizing Investments to Leverage Development (BUILD) Grant program has recently replaced the TIGER Grant program. As this is a new program, there are some unknowns that would need to be determined if this is a chosen funding source. However, this grant program is anticipated to be very similar to the TGER Grant program. The criteria for the BUILD grant include:

## Merit criteria:

- Safety
- State of Good Repair
- Economic Competitiveness
- Environmental Protection
- Quality of Life
- Innovation
- Partnership
- Non-Federal Revenue for Transportation Infrastructure Investment


## Other criteria:

- Demonstrated Project Readiness
- Project Costs and Benefits


## "How has Marion been able to build portions of Tower Terrace Road?"

A common question seems to be how the City of Marion has been able to build portions of Tower Terrace Road.

The City of Marion assesses developers at the time of development a participation cost. This cost is the equivalent of half of a 26 -foot wide street of 7 -inch thick pavement the length of the development frontage. This assumes the frontage is only on one side of Tower Terrace Road, which is common. The City of Marion pays for the increased width and thickness of the pavement that is actually constructed. The developer also pays for the equivalent of a 4-foot wide, 4-inch thick sidewalk on their side of the road, and the City of Marion pays for the increased width and thickness for the trail. Also, the developer pays for water, storm, and sanitary service to the site, and the City of Marion pays for any increase in size needed for future capacity.

Although hard to estimate precisely, the private contributions roughly amount to $15 \%$ of construction cost (or about $10 \%$ of total project cost) per side of the street. This is up to $20 \%$ to $30 \%$ total. When a developer along the corridor is ready to begin a development, the agreement is made. Typically, the jurisdiction finances the project money up front to build the roadway and charges the developer for their share of the costs. The property owner on the other side of the road is charged when that side is developed and connected to the corridor. Essentially, this is a connection fee similar to water and sewer main connection fees.

Cedar Rapids has a very similar development policy.

## Additional considerations:

- Geographic diversity among recipients

The cooperation of multiple jurisdictions in the Tower Terrace Road project is a key strength regarding the possibility of obtaining a BUILD grant. Geographic diversity may or may not be a strength, depending on other applications from within the State of lowa.

A few weaknesses have also been identified for this project and possible receipt of a BUILD Grant. The weaknesses of this project include:

- Non-Federal Revenue: This means the program administrators want to have federal participation at about $50 \%$ or less.
- Demonstrated Project Readiness: This means at least the environmental process is complete and is even better if right-of-way has been acquired. The program administrators are typically interested in "shovel ready" projects.
- The BUILD program has an emphasis on rural projects, which may be a weakness for our region.

Properly preparing a BUILD grant application takes time. Political consensus with state and federal legislators is important, as well as a ground campaign to develop support both from a letter writing standpoint but also private financial participation in the project. Two years of groundwork preparing for a BUILD grant application would not be out of question.

State and local funds are also possible funding sources. These funds include:

- Revitalize Iowa's Sound Economy (RISE): For speculative roadway improvements, 2017 grants ranged from \$72,000 to just under \$4 million.
- Tax Increment Finance (TF): Depending on the community, and whether TF districts are available, TIF funds can be used to bond projects and pay off the bond using the incremental tax from development. Available funds are tied to the value of the TF district.
- Assessments, Connection Fees, Development Agreements: Assess a portion of the cost of the roadway improvements to private developers to recapture some of the land value increase conferred upon adjacent property by the public improvement. Cedar Rapids and Marion employ both of these techniques.
- General Obligation Bonds (GOB): The public entity borrows money against the future revenues expected to be generated by the City through taxes, fees, etc. over time.


## TIMELINE OF FUNDING

Total funding amounts provide relative scope of the project; however, all funding is not instantaneously available. Table 10, on the following pages, attempts to tie the funding and expenses to a timeline, creating a cash flow diagram. The funding amounts through fiscal year 2022 are taken from the lowa DOT’s Draft 2019-2022 Statewide Transportation Improvement Program. Beyond 2022, funding amounts for swap funds/federal aid are assumed to be $\$ 2$ million per year. Table 10 is based on funding swap-eligible costs to $50 \%$. This is not a cap, but a strategy to accelerate the pace of construction.

Table 11 is based on funding swap-eligible costs to $80 \%$, which is the current Corridor MPO policy. Finally, Figure 41 is a graphic comparison of the two scenarios shown in Tables 10 and 11. As can be seen from Figure 41, the schedule for $80 \%$ swap funding level is about 8 years longer than $50 \%$. Also, some of the development-driven projects, such as Project Priorities 7 through 13, may move in the schedule based on development demand and/or may not ultimately use swap funds.

It should be noted in both Table 10 and 11 and in Figure 41, based on past practice of the cities, engineering is considered swap-eligible for all communities, but Cedar Rapids typically uses local funds for engineering. The effect of this assumption is most projects begin the engineering/concepting when the swap funds are available. However, the projects where Cedar Rapids is the sole project sponsor, the engineering begins earlier than when swap funds are available. Using local funds for project engineering is a recommended practice, because it can accelerate the project schedule, and it is encouraged by the lowa DOT.

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 50\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority <br> No. | Location on Tower Terrace Road: | Community/ <br> Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY19 | FFY20 | FFY21 | FFY22 | FFY23 | FFY24 | FFY25 | FFY26 | FFY27 | FFY28 | FFY29 | FFY30 | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | FFY37 | Grand <br> Totals |
| 1* | 1/4 Mile West of Alburnett Road | $\begin{gathered} \text { Marion/ } \\ \text { 11/17/2019 } \end{gathered}$ | SWAP/FA | 194 | 1,559 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,753 |
|  |  |  | Local | 341 | 565 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 906 |
|  |  |  | Total Funds | 535 | 2,124 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,659 |
|  |  |  | Construction |  | 1,949 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,949 |
|  |  |  | Engineering | 292 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 292 |
|  |  |  | ROW | 243 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 243 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  | 175 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 175 |
|  |  |  | Total Cost | 535 | 2,124 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,659 |
| 2* | 900 Feet East of Meadowknolls Road to 1/4 Mile West of Alburnett Road | $\begin{gathered} \text { Marion/ } \\ 11 / 17 / 2019 \end{gathered}$ | SWAP/FA | 518 | 3,153 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,671 |
|  |  |  | Local | 882 | 2,316 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,198 |
|  |  |  | Total Funds | 1,400 | 5,469 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,869 |
|  |  |  | Construction |  | 5,017 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 5,017 |
|  |  |  | Engineering | 753 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 753 |
|  |  |  | ROW | 647 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 647 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  | 452 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 452 |
|  |  |  | Total Cost | 1,400 | 5,469 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,869 |
| 3* | C Avenue to 900 Feet East of Meadowknolls Road | $\begin{gathered} \hline \text { Cedar Rapids/ } \\ \text { 11/17/2019 } \end{gathered}$ | SWAP/FA | 160 | 1,755 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,915 |
|  |  |  | Local | 878 | 1,839 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,717 |
|  |  |  | Total Funds | 1,038 | 3,594 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,632 |
|  |  |  | Construction |  | 3,297 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,297 |
|  |  |  | Engineering | 495 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 495 |
|  |  |  | ROW | 246 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 246 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin | 297 | 297 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 594 |
|  |  |  | Total Cost | 1,038 | 3,594 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,632 |
|  |  | $\begin{gathered} \text { Marion/ } \\ 11 / 17 / 2019 \end{gathered}$ | SWAP/FA | 60 | 703 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 763 |
|  |  |  | Local | 232 | 735 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 967 |
|  |  |  | Total Funds | 292 | 1,438 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,730 |
|  |  |  | Construction |  | 1,319 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,319 |
|  |  |  | Engineering | 198 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 198 |
|  |  |  | ROW | 94 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 94 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  | 119 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 119 |
|  |  |  | Total Cost | 292 | 1,438 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,730 |

TABLE 10: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 50\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 50\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority No. | Location on Tower Terrace Road: | Community/ Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY19 | FFY20 | FFY21 | FFY22 | FFY23 | FFY24 | FFY25 | FFY26 | FFY27 | FFY28 | FFY29 | FFY30 | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | FFY37 | Grand <br> Totals |
| 4 | Edgewood Road to W. <br> Edge of I-380 <br> Interchange | Cedar Rapids/ October, 2025 | SWAP/FA |  |  |  |  | 2,000 | 1,000 | 76 |  |  |  |  |  |  |  |  |  |  |  |  | 3,076 |
|  |  |  | Local |  |  |  | 857 |  |  | 703 | 3,556 |  |  |  |  |  |  |  |  |  |  |  | 5,116 |
|  |  |  | Total Funds | - | - | - | 857 | 2,000 | 1,000 | 779 | 3,556 |  |  |  |  |  |  |  |  |  |  |  | 8,192 |
|  |  |  | Construction |  |  |  |  |  |  |  | 5,714 |  |  |  |  |  |  |  |  |  |  |  | 5,714 |
|  |  |  | Engineering |  |  |  | 857 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 857 |
|  |  |  | ROW |  |  |  |  |  |  | 806 |  |  |  |  |  |  |  |  |  |  |  |  | 806 |
|  |  |  | U/G Elec |  |  |  |  |  |  | 300 |  |  |  |  |  |  |  |  |  |  |  |  | 300 |
|  |  |  | Const. Admin |  |  |  |  |  |  |  | 514 |  |  |  |  |  |  |  |  |  |  |  | 514 |
|  |  |  | Total Cost | - | - | - | 857 | - | - | 1,106 | 6,228 |  |  |  |  |  |  |  |  |  |  |  | 8,192 |
| 4* | E. Edge of I-380 Interchange to Center Point Road | Hiawatha/ October, 2025 | SWAP/FA |  |  |  | 1,810 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,810 |
|  |  |  | Local |  |  |  | 237 |  |  | 353 | 1,923 |  |  |  |  |  |  |  |  |  |  |  | 2,513 |
|  |  |  | Total Funds | - | - | - | 2,047 | - | - | 353 | 1,923 |  |  |  |  |  |  |  |  |  |  |  | 4,323 |
|  |  |  | Construction |  |  |  |  |  |  |  | 3,159 |  |  |  |  |  |  |  |  |  |  |  | 3,159 |
|  |  |  | Engineering |  |  |  | 474 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 474 |
|  |  |  | ROW |  |  |  |  |  |  | 106 |  |  |  |  |  |  |  |  |  |  |  |  | 106 |
|  |  |  | U/G Elec |  |  |  |  |  |  | 300 |  |  |  |  |  |  |  |  |  |  |  |  | 300 |
|  |  |  | Const. Admin |  |  |  |  |  |  |  | 284 |  |  |  |  |  |  |  |  |  |  |  | 284 |
|  |  |  | Total Cost | - | - | - | 474 | - | - | 406 | 3,443 |  |  |  |  |  |  |  |  |  |  |  | 4,323 |

TABLE 10: Cash Flow Diagram by Project; lowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 50\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 50\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority No. | Location on Tower Terrace Road: | Community/ <br> Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY19 | FFY20 | FFY21 | FFY22 | FFY23 | FFY24 | FFY25 | FFY26 | FFY27 | FFY28 | FFY29 | FFY30 | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | FFY37 | Grand <br> Totals |
| 5 | Robins Road to Council Street (Bridges Over Dry Creek and Canadian National Railway) | Hiawatha/ October, 2029 | SWAP/FA |  |  |  |  |  | 300 | 500 | 500 | 750 | 564 |  |  |  |  |  |  |  |  |  | 2,614 |
|  |  |  | Local |  |  |  |  |  | 472 |  |  |  |  |  | 5,898 |  |  |  |  |  |  |  | 6,370 |
|  |  |  | Total Funds | - | - | - | - | - | 772 | 500 | 500 | 750 | 564 | - | 5,898 |  |  |  |  |  |  |  | 8,984 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  | 6,294 |  |  |  |  |  |  |  | 6,294 |
|  |  |  | Engineering |  |  |  |  |  | 944 |  |  |  |  |  |  |  |  |  |  |  |  |  | 944 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  | 681 |  |  |  |  |  |  |  |  | 681 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  | 500 |  |  |  |  |  |  |  |  | 500 |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  | 566 |  |  |  |  |  |  |  | 566 |
|  |  |  | Total Cost | - | - | - | - | - | 944 | - | - | - | - | 1,181 | 6,860 |  |  |  |  |  |  |  | 8,984 |
|  |  | Robins/October, 2029 | SWAP/FA |  |  |  |  |  | 400 | 1,000 | 1,000 | 750 | 207 |  |  |  |  |  |  |  |  |  | 3,357 |
|  |  |  | Local |  |  |  |  |  | 367 |  |  |  |  |  | 3,033 |  |  |  |  |  |  |  | 3,399 |
|  |  |  | Total Funds | - | - | - | - | - | 767 | 1,000 | 1,000 | 750 | 207 | - | 3,033 |  |  |  |  |  |  |  | 6,756 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  | 4,891 |  |  |  |  |  |  |  | 4,891 |
|  |  |  | Engineering |  |  |  |  |  | 734 |  |  |  |  |  |  |  |  |  |  |  |  |  | 734 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  | 692 |  |  |  |  |  |  |  |  | 692 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  | 440 |  |  |  |  |  |  |  | 440 |
|  |  |  | Total Cost | - | - | - | - | - | 734 | - | - | - | - | 692 | 5,331 |  |  |  |  |  |  |  | 6,756 |
|  |  | Cedar Rapids/ October, 2029 | SWAP/FA |  |  |  |  |  | 300 | 424 | 500 | 500 | 389 |  |  |  |  |  |  |  |  |  | 2,113 |
|  |  |  | Local |  |  |  |  |  | 264 |  |  |  |  | 169 | 2,163 |  |  |  |  |  |  |  | 2,597 |
|  |  |  | Total Funds | - | - | - | - | - | 564 | 424 | 500 | 500 | 389 | 169 | 2,163 |  |  |  |  |  |  |  | 4,710 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  | 3,526 |  |  |  |  |  |  |  | 3,526 |
|  |  |  | Engineering |  |  |  |  |  | 529 |  |  |  |  |  |  |  |  |  |  |  |  |  | 529 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  | 337 |  |  |  |  |  |  |  |  | 337 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  | 317 |  |  |  |  |  |  |  | 317 |
|  |  |  | Total Cost | - | - | - | - | - | 529 | - | - | - | - | 337 | 3,843 |  |  |  |  |  |  |  | 4,710 |
| 6 | Relocated Winslow to Existing Winslow (Bridge Over Indian Creek) | Marion/October, 2033 | SWAP/FA |  |  |  |  |  |  |  |  |  | 840 | 2,000 | 2,000 | 701 |  |  |  |  |  |  | 5,541 |
|  |  |  | Local |  |  |  |  |  |  |  |  |  | 741 |  |  |  |  | 3 | 5,971 |  |  |  | 6,715 |
|  |  |  | Total Funds | - | - | - | - | - | - | - | - | - | 1,581 | 2,000 | 2,000 | 701 | - | 3 | 5,971 |  |  |  | 12,256 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 9,879 |  |  |  | 9,879 |
|  |  |  | Engineering |  |  |  |  |  |  |  |  |  | 1,482 |  |  |  |  |  |  |  |  |  | 1,482 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6 |  |  |  |  | 6 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 889 |  |  |  | 889 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | - | - | 1,482 | - | - | - | - | 6 | 10,768 |  |  |  | 12,256 |

TABLE 10: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 50\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 50\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority No. | Location on Tower Terrace Road: | Community/ Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY19 | FFY20 | FFY21 | FFY22 | FFY23 | FFY24 | FFY25 | FFY26 | FFY27 | FFY28 | FFY29 | FFY30 | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | FFY37 | Grand <br> Totals |
| 7* | Summerset Extended to C Avenue | $\begin{gathered} \hline \text { Cedar Rapids } \\ 11 / 17 / 2020 \end{gathered}$ | SWAP/FA | 184 |  | 3,652 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,836 |
|  |  |  | Local | 681 |  | 1,653 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,334 |
|  |  |  | Total Funds | 865 | - | 5,305 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,170 |
|  |  |  | Construction |  |  | 4,774 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,774 |
|  |  |  | Engineering | 692 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 692 |
|  |  |  | ROW | 173 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 173 |
|  |  |  | U/G Elec |  |  | 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
|  |  |  | Const. Admin |  |  | 430 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 430 |
|  |  |  | Total Cost | 865 | - | 5,304 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,170 |
| 8 | The Ridge at Indian Creek to One Mile West of Highway 13 | Marion/October, 2036 | SWAP/FA |  |  |  |  |  |  |  |  |  |  |  |  | 1,299 | 1,126 |  |  |  |  |  | 2,425 |
|  |  |  | Local |  |  |  |  |  |  |  |  |  |  |  |  | 304 |  |  |  |  | 253 | 2,557 | 3,115 |
|  |  |  | Total Funds |  |  |  |  |  |  |  |  | - | - | - | - | 1,603 | 1,126 | - | - | - | 253 | 2,557 | 5,540 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,059 | 4,059 |
|  |  |  | Engineering |  |  |  |  |  |  |  |  |  |  |  |  | 609 |  |  |  |  |  |  | 609 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 507 |  | 507 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 365 | 365 |
|  |  |  | Total Cost |  |  |  |  |  |  |  |  | - | - | - | - | 609 | - | - | - | - | 507 | 4,424 | 5,540 |

TABLE 10: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 50\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 50\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority <br> No. | Location on Tower Terrace Road: | Community/ Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY28 |  | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | FFY37 | FFY38 | FFY39 | FFY40 | FFY41 | FFY42 | FFY43 | FFY44 | FFY45 | FFY46 | FFY47 | FFY48 | Grand <br> Totals |
| 9 | One Mile West of IA | Marion/ October, 2037 | SWAP/FA |  |  | 874 | 1,538 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,412 |
|  | Highway 13 to IA |  | Local |  |  | 309 |  |  |  |  | 194 | 2,576 |  |  |  |  |  |  |  |  |  |  | 3,079 |
|  | Highway 13 |  | Total Funds |  |  | 1,183 | 1,538 | - | - | - | 194 | 2,576 | - | - | - | - | - | - |  |  |  |  | 5,491 |
|  |  |  | Construction |  |  |  |  |  |  |  |  | 4,116 |  |  |  |  |  |  |  |  |  |  | 4,116 |
|  |  |  | Engineering |  |  | 617 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 617 |
|  |  |  | ROW |  |  |  |  |  |  |  | 387 |  |  |  |  |  |  |  |  |  |  |  | 387 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  | 370 |  |  |  |  |  |  |  |  |  |  | 370 |
|  |  |  | Total Cost |  |  | 617 | - | - | - | - | 387 | 4,486 | - | - | - | - | - | - |  |  |  |  | 5,491 |
| 10 | Council Street to Turtle | Cedar Rapids/ October, 2033 | SWAP/FA |  |  |  | 462 | 729 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,191 |
|  | Run Extended |  | Local | 357 |  |  | 124 | 1,525 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,007 |
|  |  |  | Total Funds | 357 |  | - | 586 | 2,254 | - | - | - | - | - | - | - | - | - | - | - |  |  |  | 3,198 |
|  |  |  | Construction |  |  |  |  | 2,378 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,378 |
|  |  |  | Engineering | 357 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 357 |
|  |  |  | ROW |  |  |  | 249 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 249 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  | 214 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 214 |
|  |  |  | Total Cost | 357 |  | - | 249 | 2,592 | - | - | - | - | - | - | - | - | - | - | - |  |  |  | 3,198 |
| 11 | Turtle Run Extended to Summerset Extended | Cedar Rapids/ October, 2034 | SWAP/FA |  |  |  |  | 1,271 | 647 |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,918 |
|  |  |  | Local | 560 |  |  |  | 212 | 2,365 |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,137 |
|  |  |  | Total Funds | 560 | - | - | - | 1,483 | 3,012 | - | - | - | - | - | - | - | - | - |  |  |  |  | 5,055 |
|  |  |  | Construction |  |  |  |  |  | 3,734 |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,734 |
|  |  |  | Engineering | 560 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 560 |
|  |  |  | ROW |  |  |  |  | 425 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 425 |
|  |  |  | U/G Elec |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  | 336 |  |  |  |  |  |  |  |  |  |  |  |  |  | 336 |
|  |  |  | Total Cost | 560 | - | - | - | 425 | 4,070 | - | - | - | - | - | - | - | - | - | - | - |  |  | 5,055 |

TABLE 10: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 50\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 50\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority <br> No. | Location on Tower Terrace Road: | Community/ Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY28 |  | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | FFY37 | FFY38 | FFY39 | FFY40 | FFY41 | FFY42 | FFY43 | FFY44 | FFY45 | FFY46 | FFY47 | FFY48 | Grand Totals |
| 12 | Center Point Road to Stamy Road | Hiawatha/October, 2040 | SWAP/FA |  |  |  |  |  | 907 | 67 |  |  |  |  |  |  |  |  |  |  |  |  | 974 |
|  |  |  | Local |  |  |  |  |  | 146 |  |  |  |  | 10 | 1,300 |  |  |  |  |  |  |  | 1,456 |
|  |  |  | Total Funds | - | - | - | - | - | 1,052 | 67 | - | - | - | 10 | 1,300 | - | - | - | - | - | - |  | 2,430 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  | 1,944 |  |  |  |  |  |  |  | 1,944 |
|  |  |  | Engineering |  |  |  |  |  | 292 |  |  |  |  |  |  |  |  |  |  |  |  |  | 292 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  | 20 |  |  |  |  |  |  |  |  | 20 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  | 175 |  |  |  |  |  |  |  | 175 |
|  |  |  | Total Cost | - | - | - | - | - | 292 | - | - | - | - | 20 | 2,119 | - | - | - | - | - | - |  | 2,430 |
|  |  | Robins/ <br> October, 2040 | SWAP/FA |  |  |  |  |  | 446 | 171 |  |  |  |  |  |  |  |  |  |  |  |  | 617 |
|  |  |  | Local |  |  |  |  |  | 77 |  |  |  |  | 31 | 602 |  |  |  |  | - |  |  | 709 |
|  |  |  | Total Funds | - | - | - | - | - | 523 | 171 | - | - | - | 31 | 602 | - | - | - | - | - | - |  | 1,326 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  | 1,020 |  |  |  |  |  |  |  | 1,020 |
|  |  |  | Engineering |  |  |  |  |  | 153 |  |  |  |  |  |  |  |  |  |  |  |  |  | 153 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  | 61 |  |  |  |  |  |  |  |  | 61 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  | 92 |  |  |  |  |  |  |  | 92 |
|  |  |  | Total Cost | - | - | - | - | - | 153 | - | - | - | - | 61 | 1,112 | - | - | - | - | - | - |  | 1,326 |
| 13 | Stamy Road to Robins Road | Hiawatha/October, 2041 | SWAP/FA |  |  |  |  |  |  | 881 | 774 |  |  |  |  |  |  |  |  |  |  |  | 1,655 |
|  |  |  | Local |  |  |  |  |  |  | 229 |  |  |  |  | 46 | 1,944 |  |  |  |  |  |  | 2,219 |
|  |  |  | Total Funds | - | - | - | - | - | - | 1,110 | 774 | - | - | - | 46 | 1,944 | - | - | - | - | - | - | 3,874 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  | 3,050 |  |  |  |  |  |  | 3,050 |
|  |  |  | Engineering |  |  |  |  |  |  | 458 |  |  |  |  |  |  |  |  |  |  |  |  | 458 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  | 92 |  |  |  |  |  |  |  | 92 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  | 274 |  |  |  |  |  |  | 274 |
|  |  |  | Total Cost | - | - | - | - | - | - | 458 | - | - | - | - | 92 | 3,324 | - | - | - | - | - | - | 3,874 |
|  |  | Robins/October, 2041 | SWAP/FA |  |  |  |  |  |  | 881 | 702 |  |  |  |  |  |  |  |  |  |  |  | 1,583 |
|  |  |  | Local |  |  |  |  |  |  | 203 |  |  |  |  | 26 | 1,598 |  |  |  |  |  |  | 1,827 |
|  |  |  | Total Funds | - | - | - | - | - | - | 1,084 | 702 | - | - | - | 26 | 1,598 | - | - | - | - | - | - | 3,410 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  | 2,707 |  |  |  |  |  |  | 2,707 |
|  |  |  | Engineering |  |  |  |  |  |  | 406 |  |  |  |  |  |  |  |  |  |  |  |  | 406 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  | 53 |  |  |  |  |  |  |  | 53 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  | 244 |  |  |  |  |  |  | 244 |
|  |  |  | Total Cost | - | - | - | - | - | - | 406 | - | - | - | - | 53 | 2,951 | - | - | - | - | - | - | 3,410 |

* NOTE: Denotes projects with programmed funding already in the Transportation Improvement Program (TIP)

TABLE 10: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 50\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 80\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority No. | Location on Tower Terrace Road: | Community/ <br> Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY19 | FFY20 | FFY21 | FFY22 | FFY23 | FFY24 | FFY25 | FFY26 | FFY27 | FFY28 | FFY29 | FFY30 | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | Grand <br> Totals |
| 1* | 1/4 Mile West of Alburnett Road | $\begin{gathered} \hline \text { Marion/ } \\ 11 / 17 / 2019 \end{gathered}$ | SWAP/FA | 194 | 1,559 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,753 |
|  |  |  | Local | 341 | 565 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 906 |
|  |  |  | Total Funds | 535 | 2,124 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,659 |
|  |  |  | Construction |  | 1,949 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,949 |
|  |  |  | Engineering | 292 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 292 |
|  |  |  | ROW | 243 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 243 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  | 175 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 175 |
|  |  |  | Total Cost | 535 | 2,124 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,659 |
| 2* | 900 Feet East of Meadowknolls Road to 1/4 Mile West of Alburnett Road | $\begin{gathered} \text { Marion/ } \\ 11 / 17 / 2019 \end{gathered}$ | SWAP/FA | 518 | 3,153 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,671 |
|  |  |  | Local | 882 | 2,316 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,198 |
|  |  |  | Total Funds | 1,400 | 5,469 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,869 |
|  |  |  | Construction |  | 5,017 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 5,017 |
|  |  |  | Engineering | 753 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 753 |
|  |  |  | ROW | 647 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 647 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  | 452 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 452 |
|  |  |  | Total Cost | 1,400 | 5,469 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,869 |
| 3* | C Avenue to 900 Feet East of Meadowknolls Road | $\begin{gathered} \hline \text { Cedar Rapids/ } \\ 11 / 17 / 2019 \end{gathered}$ | SWAP/FA | 160 | 1,755 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,915 |
|  |  |  | Local | 878 | 1,839 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,717 |
|  |  |  | Total Funds | 1,038 | 3,594 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,632 |
|  |  |  | Construction |  | 3,297 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,297 |
|  |  |  | Engineering | 495 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 495 |
|  |  |  | ROW | 246 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 246 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin | 297 | 297 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 594 |
|  |  |  | Total Cost | 1,038 | 3,594 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,632 |
|  |  | $\begin{gathered} \text { Marion/ } \\ 11 / 17 / 2019 \end{gathered}$ | SWAP/FA | 60 | 703 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 763 |
|  |  |  | Local | 232 | 735 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 967 |
|  |  |  | Total Funds | 292 | 1,438 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,730 |
|  |  |  | Construction |  | 1,319 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,319 |
|  |  |  | Engineering | 198 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 198 |
|  |  |  | ROW | 94 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 94 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  | 119 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 119 |
|  |  |  | Total Cost | 292 | 1,438 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,730 |

TABLE 11: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 80\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 80\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority <br> No. | Location on Tower Terrace Road: | Community/ <br> Letting Date | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Grand <br> Totals |
|  |  |  |  | FFY19 | FFY20 | FFY21 | FFY22 | FFY23 | FFY24 | FFY25 | FFY26 | FFY27 | FFY28 | FFY29 | FFY30 | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 |  |
| 4 | Edgewood Road to W. <br> Edge of I-380 <br> Interchange | Cedar Rapids/ <br> October, 2025 | SWAP/FA |  |  |  |  | 2,000 | 2,000 | 920 |  |  |  |  |  |  |  |  |  |  |  | 4,920 |
|  |  |  | Local |  | 857 |  |  |  |  | 161 | 2,254 |  |  |  |  |  |  |  |  |  |  | 3,272 |
|  |  |  | Total Funds | - | 857 | - | - | 2,000 | 2,000 | 1,081 | 2,254 |  |  |  |  |  |  |  |  |  |  | 8,192 |
|  |  |  | Construction |  |  |  |  |  |  |  | 5,714 |  |  |  |  |  |  |  |  |  |  | 5,714 |
|  |  |  | Engineering |  | 857 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 857 |
|  |  |  | ROW |  |  |  |  |  |  | 806 |  |  |  |  |  |  |  |  |  |  |  | 806 |
|  |  |  | U/G Elec |  |  |  |  |  |  | 300 |  |  |  |  |  |  |  |  |  |  |  | 300 |
|  |  |  | Const. Admin |  |  |  |  |  |  |  | 514 |  |  |  |  |  |  |  |  |  |  | 514 |
|  |  |  | Total Cost | - | 857 | - | - | - | - | 1,106 | 6,228 |  |  |  |  |  |  |  |  |  |  | 8,192 |
| 4* | E. Edge of I-380 Interchange to Center Point Road | Hiawatha/ October, 2025 | SWAP/FA |  |  |  | 2,000 |  |  | 896 |  |  |  |  |  |  |  |  |  |  |  | 2,896 |
|  |  |  | Local |  |  |  | 95 |  |  | 21 | 1,311 |  |  |  |  |  |  |  |  |  |  | 1,427 |
|  |  |  | Total Funds | - | - | - | 2,095 | - | - | 917 | 1,311 |  |  |  |  |  |  |  |  |  |  | 4,323 |
|  |  |  | Construction |  |  |  |  |  |  |  | 3,159 |  |  |  |  |  |  |  |  |  |  | 3,159 |
|  |  |  | Engineering |  |  |  | 474 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 474 |
|  |  |  | ROW |  |  |  |  |  |  | 106 |  |  |  |  |  |  |  |  |  |  |  | 106 |
|  |  |  | U/G Elec |  |  |  |  |  |  | 300 |  |  |  |  |  |  |  |  |  |  |  | 300 |
|  |  |  | Const. Admin |  |  |  |  |  |  |  | 284 |  |  |  |  |  |  |  |  |  |  | 284 |
|  |  |  | Total Cost | - | - | - | 474 | - | - | 406 | 3,443 |  |  |  |  |  |  |  |  |  |  | 4,323 |

TABLE 11: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 80\% Swap

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 80\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority <br> No. | Location on Tower Terrace Road: | Community/ <br> Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY19 | FFY20 | FFY21 | FFY22 | FFY23 | FFY24 | FFY25 | FFY26 | FFY27 | FFY28 | FFY29 | FFY30 | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | Grand <br> Totals |
| 5 | Robins Road to Council Street (Bridges Over Dry Creek and Canadian National Railway) | Hiawatha/ | SWAP/FA |  |  |  |  |  |  | 184 | 137 | 700 | 700 | 700 | 700 | 700 | 361 |  |  |  |  | 4,182 |
|  |  | October, 2031 | Local |  |  |  |  |  |  |  | 189 |  |  |  |  | 136 | 4,477 |  |  |  |  | 4,802 |
|  |  |  | Total Funds | - | - | - | - | - | - | 184 | 326 | 700 | 700 | 700 | 700 | 836 | 4,838 |  |  |  |  | 8,984 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,294 |  |  |  |  | 6,294 |
|  |  |  | Engineering |  |  |  |  |  |  |  | 944 |  |  |  |  |  |  |  |  |  |  | 944 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  | 681 |  |  |  |  |  | 681 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  | 500 |  |  |  |  |  | 500 |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  | 566 |  |  |  |  | 566 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | 944 | - | - | - | - | 1,181 | 6,860 |  |  |  |  | 8,984 |
|  |  | Robins/ | SWAP/FA |  |  |  |  |  |  |  | 1,150 | 800 | 800 | 800 | 800 | 800 | 222 |  |  |  |  | 5,372 |
|  |  | October, 2031 | Local |  |  |  |  |  |  |  | 147 |  |  |  |  | 138 | 1,099 |  |  |  |  | 1,384 |
|  |  |  | Total Funds | - | - | - | - | - | - | - | 1,297 | 800 | 800 | 800 | 800 | 938 | 1,321 |  |  |  |  | 6,756 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,891 |  |  |  |  | 4,891 |
|  |  |  | Engineering |  |  |  |  |  |  |  | 734 |  |  |  |  |  |  |  |  |  |  | 734 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  | 692 |  |  |  |  |  | 692 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  | 440 |  |  |  |  | 440 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | 734 | - | - | - | - | 692 | 5,331 |  |  |  |  | 6,756 |
|  |  | Cedar Rapids/ | SWAP/FA |  |  |  |  |  |  |  | 713 | 500 | 500 | 500 | 500 | 500 | 168 |  |  |  |  | 3,381 |
|  |  | October, 2031 | Local |  |  |  |  |  | - |  | 106 |  |  |  |  | 67 | 1,155 |  |  |  |  | 1,329 |
|  |  |  | Total Funds | - | - | - | - | - | - | - | 819 | 500 | 500 | 500 | 500 | 567 | 1,323 |  |  |  |  | 4,710 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,526 |  |  |  |  | 3,526 |
|  |  |  | Engineering |  |  |  |  |  |  |  | 529 |  |  |  |  |  |  |  |  |  |  | 529 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  | 337 |  |  |  |  |  | 337 |
|  |  |  | U/G Elec |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  | 317 |  |  |  |  | 317 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | 529 | - | - | - | - | 337 | 3,843 |  |  |  |  | 4,710 |

TABLE 11: Cash Flow Diagram by Project; lowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 80\% Swap

## FUNDING

| PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 80\% SWAP FUND PARTICIPATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Proiority <br> No. | Location on Tower Terrace Road: | Community/ Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | FFY19 | FFY20 | FFY21 |  | FFY31 | FFY32 | FFY33 | FFY34 | FFY35 | FFY36 | FFY37 | FFY38 | FFY39 | FFY40 | FFY41 | FFY42 | FFY43 | FFY44 | $\begin{aligned} & \text { Grand } \\ & \text { Totals } \end{aligned}$ |
| 6 | Relocated Winslow to Existing Winslow (Bridge Over Indian Creek) | Marion/October, 2035 | SWAP/FA |  |  |  |  | 1,249 | 2,000 | 2,000 | 2,000 | 1,617 |  |  |  |  |  |  |  |  |  | 8,866 |
|  |  |  | Local |  |  |  |  | 296 |  |  |  | 1 | 3,093 |  |  |  |  |  | - |  |  | 3,390 |
|  |  |  | Total Funds | - | - | - |  | 1,545 | 2,000 | 2,000 | 2,000 | 1,618 | 3,093 | - | - | - | - | - | - | - |  | 12,256 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  | 9,879 |  |  |  |  |  |  |  |  | 9,879 |
|  |  |  | Engineering |  |  |  |  | 1,482 |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,482 |
|  |  |  | Row |  |  |  |  |  |  |  |  | 6 |  |  |  |  |  |  |  |  |  | 6 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  | 889 |  |  |  |  |  |  |  |  | 889 |
|  |  |  | Total Cost | - | - | - |  | 1,482 | - | - | - | 6 | 10,768 | - | - | - | - | - | - | - |  | 12,256 |
| 7* | Summerset Extended to C Avenue | $\begin{array}{\|c\|} \hline \text { Cedar Rapids } \\ \text { 11/17/2020 } \\ \hline \end{array}$ | SWAP/FA | 184 |  | 3,652 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,836 |
|  |  |  | Local | 681 |  | 1,653 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,334 |
|  |  |  | Total Funds | 865 | - | 5,305 | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,170 |
|  |  |  | Construction |  |  | 4,774 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4,774 |
|  |  |  | Engineering | 692 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 692 |
|  |  |  | Row | 173 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 173 |
|  |  |  | U/G Elec |  |  | 100 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
|  |  |  | Const. Admin |  |  | 430 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 430 |
|  |  |  | Total Cost | 865 | - | 5,304 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6,170 |

TABLE 11: Cash Flow Diagram by Project; Iowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 80\% Swap

## FUNDING

PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 80\% SWAP FUND PARTICIPATION

| Proiority No. | Location on Tower Terrace Road: | Community/ Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Grand <br> Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | FFY35 | FFY36 | FFY37 | FFY38 | FFY39 | FFY40 | FFY41 | FFY42 | FFY43 | FFY44 | FFY45 | FFY46 | FFY47 | FFY48 | FFY49 | FFY50 | FFY51 |  |
| 8 | The Ridge at Indian Creek to One Mile West of Highway 13 | Marion/October, 2040 | SWAP/FA |  | 383 | 2,000 | 1,497 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,880 |
|  |  |  | Local |  | 304 |  |  |  |  | 101 | 1,254 |  |  |  |  |  |  |  |  |  |  | 1,660 |
|  |  |  | Total Funds |  | 687 | 2,000 | 1,497 | - | - | 101 | 1,254 | - | - | - | - | - | - |  |  |  |  | 5,540 |
|  |  |  | Construction |  |  |  |  |  |  |  | 4,059 |  |  |  |  |  |  |  |  |  |  | 4,059 |
|  |  |  | Engineering |  | 609 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 609 |
|  |  |  | ROW |  |  |  |  |  |  | 507 |  |  |  |  |  |  |  |  |  |  |  | 507 |
|  |  |  | U/G Elec |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  | 365 |  |  |  |  |  |  |  |  |  |  | 365 |
|  |  |  | Total Cost |  | 609 | - | - | - | - | 507 | 4,424 | - | - | - | - | - | - |  |  |  |  | 5,540 |
| 9 | One Mile West of IA Highway 13 to IA Highway 13 | Marion/October, 2042 | SWAP/FA | SHIFT CALENDAR TO FFY35 |  |  | 503 | 2,000 | 1,357 |  |  |  |  |  |  |  |  |  |  |  |  | 3,860 |
|  |  |  | Local |  |  |  | 309 |  |  | - |  | 77 | 1,244 |  |  |  | - |  |  |  |  | 1,631 |
|  |  |  | Total Funds |  | - | - | 812 | 2,000 | 1,357 | - | - | 77 | 1,244 | - | - | - | - |  | - |  |  | 5,491 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  | 4,116 |  |  |  |  |  |  |  |  | 4,116 |
|  |  |  | Engineering |  |  |  | 617 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 617 |
|  |  |  | ROW |  |  |  |  |  |  |  |  | 387 |  |  |  |  |  |  |  |  |  | 387 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  | 370 |  |  |  |  |  |  |  |  | 370 |
|  |  |  | Total Cost |  | - | - | 617 | - | - | - | - | 387 | 4,486 | - | - | - | - |  | - |  |  | 5,491 |
| 10 | Council Street to Turtle Run Extended | Cedar Rapids/ October, 2038 | SWAP/FA |  |  |  |  |  | 643 | 1,262 |  |  |  |  |  |  |  |  |  |  |  | 1,905 |
|  |  |  | Local |  | 357 |  |  |  | 50 | 886 |  |  |  |  |  |  |  |  | - |  |  | 1,293 |
|  |  |  | Total Funds | - | 357 | - | - | - | 693 | 2,148 | - | - | - | - | - | - | - |  | - | - |  | 3,198 |
|  |  |  | Construction |  |  |  |  |  |  | 2,378 |  |  |  |  |  |  |  |  |  |  |  | 2,378 |
|  |  |  | Engineering |  | 357 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 357 |
|  |  |  | ROW |  |  |  |  |  | 249 |  |  |  |  |  |  |  |  |  |  |  |  | 249 |
|  |  |  | U/G Elec |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  | 214 |  |  |  |  |  |  |  |  |  |  |  | 214 |
|  |  |  | Total Cost | - | 357 | - | - | - | 249 | 2,592 | - | - | - | - | - | - | - |  | - | - |  | 3,198 |
| 11 | Turtle Run Extended to Summerset Extended | Cedar Rapids/ <br> October, 2042 | SWAP/FA |  |  |  |  |  |  | 738 | 2,000 | 330 |  |  |  |  |  |  |  |  |  | 3,068 |
|  |  |  | Local |  |  | 560 |  |  |  |  | 85 | 1,342 |  |  |  |  |  |  |  | - |  | 1,987 |
|  |  |  | Total Funds | - | - | 560 | - | - | - | 738 | 2,085 | 1,672 | - | - | - | - | - |  | - | - | - | 5,055 |
|  |  |  | Construction |  |  |  |  |  |  |  |  | 3,734 |  |  |  |  |  |  |  |  |  | 3,734 |
|  |  |  | Engineering |  |  | 560 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 560 |
|  |  |  | ROW |  |  |  |  |  |  |  | 425 |  |  |  |  |  |  |  |  |  |  | 425 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  | 336 |  |  |  |  |  |  |  |  |  | 336 |
|  |  |  | Total Cost | - | - | 560 | - | - | - | - | 425 | 4,070 | - | - | - | - | - |  | - | - | - | 5,055 |

TABLE 11: Cash Flow Diagram by Project; lowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 80\% Swap

## FUNDING

PROJECT CASH FLOW OF EXPENSES AND FUNDING - ASSUMING 80\% SWAP FUND PARTICIPATION

| Proiority <br> No. | Location on Tower Terrace Road: | Community/ <br> Letting Date |  | Amounts in 1000's of 2018 Dollars - NOT adjusted for inflation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | FFY35 | FFY36 | FFY37 | FFY38 | FFY39 | FFY40 | FFY41 | FFY42 | FFY43 | FFY44 | FFY45 | FFY46 | FFY47 | FFY48 | FFY49 | FFY50 | FFY51 | Grand <br> Totals |
| 12 | Center Point Road to Stamy Road | Hiawatha/ October, 2047 | SWAP/FA |  |  |  |  |  |  |  |  | 1,119 | 439 |  |  |  |  |  |  |  |  | 1,558 |
|  |  |  | Local |  |  |  |  |  |  |  |  | 58 |  | - |  |  | 4 | 810 |  |  |  | 872 |
|  |  |  | Total Funds | - | - | - | - | - | - | - | - | 1,177 | 439 | - | - | - | 4 | 810 | - | - | - | 2,430 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,944 |  |  |  | 1,944 |
|  |  |  | Engineering |  |  |  |  |  |  |  |  | 292 |  |  |  |  |  |  |  |  |  | 292 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  |  | 20 |  |  |  |  | 20 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 175 |  |  |  | 175 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | - | 292 | - | - | - | - | 20 | 2,119 | - | - | - | 2,430 |
|  |  | Robins/October, 2047 | SWAP/FA |  |  |  |  |  |  |  |  | 551 | 437 |  |  |  |  |  |  |  |  | 988 |
|  |  |  | Local |  |  |  |  |  |  |  |  | 31 |  |  |  |  | 12 | 296 |  |  |  | 338 |
|  |  |  | Total Funds | - | - | - | - | - | - | - | - | 582 | 437 | - | - | - | 12 | 296 | - | - | - | 1,326 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1,020 |  |  |  | 1,020 |
|  |  |  | Engineering |  |  |  |  |  |  |  |  | 153 |  |  |  |  |  |  |  |  |  | 153 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  |  | 61 |  |  |  |  | 61 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 92 |  |  |  | 92 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | - | 153 | - | - | - | - | 61 | 1,112 | - | - | - | 1,326 |
| 13 | Stamy Road to Robins Road | Hiawatha/ October, 2048 | SWAP/FA |  |  |  |  |  |  |  |  |  | 562 | 1,000 | 1,086 |  |  |  |  |  |  | 2,648 |
|  |  |  | Local |  |  |  |  |  |  |  |  |  | 92 |  |  |  |  | 18 | 1,116 |  |  | 1,226 |
|  |  |  | Total Funds | - | - | - | - | - | - | - | - | - | 654 | 1,000 | 1,086 | - | - | 18 | 1,116 | - | - | 3,874 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,050 |  |  | 3,050 |
|  |  |  | Engineering |  |  |  |  |  |  |  |  |  | 458 |  |  |  |  |  |  |  |  | 458 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 92 |  |  |  | 92 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 274 |  |  | 274 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | - | - | 458 | - | - | - | - | 92 | 3,324 | - | - | 3,874 |
|  |  | Robins/October, 2048 | SWAP/FA |  |  |  |  |  |  |  |  |  | 562 | 1,000 | 971 |  |  |  |  |  |  | 2,533 |
|  |  |  | Local |  |  |  |  |  |  |  |  |  | 81 |  |  |  |  | 11 | 786 |  |  | 877 |
|  |  |  | Total Funds | - | - | - | - | - | - | - | - | - | 643 | 1,000 | 971 | - | - | 11 | 786 | - | - | 3,410 |
|  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,707 |  |  | 2,707 |
|  |  |  | Engineering |  |  |  |  |  |  |  |  |  | 406 |  |  |  |  |  |  |  |  | 406 |
|  |  |  | ROW |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 53 |  |  |  | 53 |
|  |  |  | U/G Elec |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  | - |
|  |  |  | Const. Admin |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 244 |  |  | 244 |
|  |  |  | Total Cost | - | - | - | - | - | - | - | - | - | 406 | - | - | - | - | 53 | 2,951 | - | - | 3,410 |

* NOTE: Denotes projects with programmed funding already in the Transportation Improvement Program (TIP)

TABLE 11: Cash Flow Diagram by Project; lowa DOT Draft 2019-2022 Statewide Transportation Improvement Program - 80\% Swap

## FUNDING



TABLE 12: Comparison of Project Timelines with $50 \%$ versus $80 \%$ Swap Funding

## MEETING MINUTES

# Tower Terrace Road Corridor Management Plan Update <br> Advisory Group Kickoff <br> April 25, 2018 

Jurisdiction Attendees: John Witt, Brenna Fall, Brad Ketels, Chuck Hinz, Kesha Billings, Michael Barkalow, Kim Downs, John Bender

Corridor MPO Attendees: Bill Micheel, Brandon Whyte, Hilary Hershner
Consultant Attendees: Jeff Morrow, Michaela LeClair, Megan Moffitt, Laura Lutz-Zimmerman, Mike Kurek

## Absent: Kent Ellis

1. Introductions: All introduced name and role
2. Overview of Project
a. Original Study

Meeting Notes: GENERAL OVERVIEW
b. Role of Advisory Group

Meeting Notes: Discussed that the Advisory Group is made up of constituent/jurisdiction members and will help guide the update to the TTR Corridor Management Plan; input is desired from everyone; ultimately this will be the jurisdiction/constituent project
c. Goals and Vision

Meeting Notes:
i. Vision: Original vision generally acceptable; Slightly modified to a new suggested vision of: A regionally-significant, multi-modal transportation corridor constructed for the benefit of citizens in multiple jurisdictions that is safe, efficient, effective, aesthetically appealing, and environmentally friendly.
ii. Goals: Original goals generally acceptable; want to make this update a planning tool toward the orderly funding and construction of TTR

## 3. Planning Area

Meeting Notes: Reviewed land uses for jurisdictions; also discussed limited access to about 1,000 feet; with land use and expected future needs, discussed that lower rather than high speeds were desired (although may be difficult to control until development catches up in some areas)

## 4. Schedule

Meeting Notes:
a. Discussed schedule to of the TTR Corridor Management Plan Update: All seemed that the schedule was sufficient; approval from Corridor MPO and jurisdictions will ultimately be needed.
b. Schedule of various TTR portions: Discussed that bite-sized pieces of TTR may be beneficial to have an actionable, fundable project for future; this may include jurisdictions working together or staying separate (if feasible)

## 5. General Discussion

Meeting Notes:
a. Environmentally-friendly: It was discussed that environmentally-friendly design should be included, which is currently still in the vision statement.
i. Suggestion of native grasses and pollinators instead of grass, when possible; desire to come to a consensus among jurisdictions

1. Consultant to bring ideas to next meeting
ii. Maintenance also needs to be addressed
b. Trees: Desire for some kind of trees in the design
c. Lighting: Desire for some kind of lighting along the corridor
d. Aesthetics: Balance of visually appealing and cost/maintenance needs
e. Safety: Need to keep safety for all users top of mind
f. Environmental: Map of possible environmental issues was provided for all to review (Map in Appendix)
i. Some segments will require more intense review
g. Railroad: Need to address Canadian National (CN) railroad and make contact
h. Bridge: Need to address bridges needed throughout corridor to balance cost and aesthetics
i. Future I-380 Interchange: Need to address this future project with the plan update
j. Cost: Need to keep cost in mind; also need to update costs so the project corridors have a realistic idea of what is needed for funding.
k. Funding: Update will look into funding strategies that may be available
I. Action-oriented plan: Desire actionable plan that includes a logical order of schedule and helps decide funding and priority areas
m. General theme: All seemed to agree that a plan adopted by all is desired and that plan needs to have consistency while allowing jurisdictions to have some flexibility depending on different issues they may encounter.

## 6. Next Meeting

Meeting Notes: Doodle poll will be sent; next meeting to be held in May

## MEETING MINUTES

Tower Terrace Road Corridor Management Plan Update Advisory Group<br>May 30, 2018

Jurisdiction Attendees: John Witt, Brenna Fall, Kent Ellis, Chuck Hinz, Kesha Billings, Michael Barkalow, Kim Downs, John Bender

Corridor MPO Attendees: Bill Micheel, Brandon Whyte, Hilary Hershner
Consultant Attendees: Jeff Morrow, Michaela LeClair, Megan Moffitt, Mike Kurek
Absent: Brad Ketels

1. PowerPoint Presentation
a. Schedule: Reviewed schedule with the group and next steps
b. Vision Statement: Reviewed revised vision statement
i. Some discussion if additional verbiage was needed to define the corridor, but it was decided not to include additional language
c. Goals: Reviewed goals
d. Planning Area: Reviewed planning area
e. Land Use: Reviewed land use map
i. Took questions about how density was determined
ii. Discussed that approximately $60 \%$ of land use is zoned for residential use
iii. Discussed that a portion of Cedar Rapids to the west is not currently deemed a developable space
iv. Discussed that future growth and estimations of when development is likely will be key. A realistic timeframe is needed.
v. Will print larger map and materials for future meetings
f. Design Elements:
i. Discussed the original plan, general design elements, and possible differences in the update
ii. Discussed the requirements of the Long Range Transportation Plan (LRTP)
2. Per this plan: low speed major arterial is $25-35 \mathrm{mph}$, planted medians are preferred, and $10^{\prime}$ sidepath OR $3^{\prime}$ min physical barrier with 5 ' min travel area (protected bike lane)
iii. Showed various median treatment options, as well as concerns and benefits of the options shown
3. Grass, bioswales, landscaped, native plants/grasses, combinations, paved, nose treatments
a. It was discussed if medians could be narrowed to help with right of way acquisition
b. It was also discussed that right of way should not be compromised because space needs to be provided for utilities and other considerations
c. It was also discussed that storm water management best practices are encouraged
d. Medians will be discussed more with jurisdictions in June meetings and a recommendation will be brought forward to the group
iv. Access Spacing was discussed with what the original plan intended and what has been developed, with some exceptions shown
4. Group had consensus that the original intent of $1,200^{\prime}$ permanent and 600' partial access should be maintained
5. Also discussed that all jurisdictions are recommitted to this effort
v. Lighting options were shown, as well as benefits and challenges for lighting in the medians and on the edge of the roadway.
6. Discussed that lighting may be one of the elements for jurisdictions to determine
7. The intent is to incorporate lighting
vi. Cross sections were shown of the original study and an updated option with 10' sidepaths on both sides and omitting the bike lane at the full build
8. Revised option still provides partial and full build
9. Anticipated cost savings with the revised option were provided (both in right of way needs and construction costs)
10. CMPO discussed that the City of Marion BPAC already approved this kind of revised option with $10^{\prime}$ lanes on both sides of the road
vii. Speed was discussed regarding the posted speed
11. Since $60 \%$ of land use shows residential, a 35 mph speed is recommended
12. Until development happens, motorists traveling at a higher speed will be a concern
a. This may be able to be controlled by various median treatments, such as adding ornamental trees, grasses, etc.
b. This may also be able to be controlled by vertical alignment changes so drivers cannot see too far ahead in the travel lane viii. Traffic estimating was discussed, especially considering development of the future l-380 interchange
13. Update will consider future interchange
14. CMPO will be updating their traffic model
a. They will match the update phasing and funding to findings
ix. Alignment was discussed
15. Horizontal alignment more or less set
16. Vertical alignment may be able to be adjusted to help with speeding issues and concerns
17. I-380 interchange should plan to accommodate the trail in some way
a. Could use the interchange example from the City of Urbandale, which was shown at the meeting.
i. Tunnels under the roadway
b. Will eventually need to discuss if the trail should be on both sides or one side and reconnect on the roadway after the interchange
$x$. The CN Railroad was contacted after the last meeting and they provided requirements for alignment, roadway, and bridge, as well as figures estimating road, signals, lights, gates, etc.
18. RR prefers grade separation
a. If at grade is selected, they would consider a new crossing if 2 crossing closures were offered in the same region
19. At grade and grade separated was discussed as a group
xi. Estimated slab bridge options were provided and discussed
20. The general consensus was that a grade separated bridge crossing may make more sense
xii. A brief recap of the environmental review was provided without discussion needed.
21. General Discussion: General discussion took place throughout the PowerPoint presentation
22. Schedule/Next Steps: Next steps are to meet individually with jurisdictions in June, then gather the Advisory Group in July. A public meeting will be held in July or early August. Draft plan will be delivered in August and final plan in September.

## MEETING MINUTES

## Tower Terrace Road Corridor Management Plan Update <br> Advisory Group <br> September 19, 2018

Jurisdiction Attendees: John Witt, Brenna Fall, Kent Ellis, Chuck Hinz, Kesha Billings, Michael Barkalow, Kim Downs, John Bender, Brad Ketels, Brent Oleson

Corridor MPO Attendees: Bill Micheel, Hilary Hershner
Consultant Attendees: Jeff Morrow, Michaela LeClair, Megan Moffitt, Mike Kurek

1. PowerPoint Presentation
a. Schedule: Reviewed schedule with the group and next steps
b. Grade Separated Bike Lanes
i. Discussed I-380 option to have grade separation for bicyclists and pedestrians
ii. Cost comparisons have been calculated for grade separated versus at grade crossings of the trail
c. Alignment at Canadian National Railway
i. Discussed curved versus straight alignment, including possible pros and cons
ii. Cost comparisons have been calculated for the two options - The straight alignment costs more than the curved alignment
iii. Discussed that this is an expensive portion of Tower Terrace Road and is geographically the responsibility of the City of Robins, but it's hard to see the City of Robins receives the benefit relative to the amount of local funding required to build this segment.
2. Suggested Robins share be split or supplemented with funds from other jurisdictions may be helpful
3. Project Priorities
a. Discussed that project priorities were determined based on meetings with jurisdictions and having a manageable size of about $\$ 5$ million for construction
b. Projects earlier in in the timeline to construction have funding in place and/or are closer in proximity to the I-380 connection
c. Projects that require extra time due to size and complexity are the next priority projects (the bridge projects: Bridges over Dry Creek, CN Railroad, and Indian Creek)
d. Projects driven by development may be pushed back but can float depending on pace of development
e. A map showing priorities was shown and included in the update document
4. Project Development Timeline
a. A project development timeline (also included in the update document) was discussed that shows project concept all the way through construction
i. This shows a project takes about 7 years from development up to construction. The current CMPO average is 5.6 years per project.
5. Schedule and Funding
a. Options for $50 \%$ and $80 \%$ swap were provided
i. $80 \%$ is a more traditional funding approach
ii. $50 \%$ would accelerate the schedule
iii. The schedule assumes the start year of each project coincides with the first available funding to pay for engineering. Cedar Rapids is the exception as they fund the engineering with local dollars and use all of the swap funding on right-of-way and construction. As such, Cedar Rapids projects start earlier than the other communities' projects.
b. Calculations assumed $\$ 2$ million from CMPO, but not sure if this is the correct amount to assume
c. Discussed that it would be helpful to know the expectations of the timeline
d. Additional information on funding estimate calculations in the Appendix of the update
e. All calculations done in 2018 dollars; inflation will increase costs
f. Suggested that discussions surrounding equitable shares would need to be discussed for all jurisdictions and agencies
6. Next Steps
a. Advisory Group comments on the update are needed by October 1, 2018 and can be sent to Hilary Hershner
b. Public involvement meeting will be determined
i. More than likely, will include a presentation and open house format
ii. Information will be shared with jurisdictions and agencies to communicate the meeting to stakeholders and general public
c. Final Report will follow public involvement meeting
7. General Discussion: General discussion took place throughout the PowerPoint presentation

## MEETING MINUTES

# Tower Terrace Road Corridor Management Plan Update 

Advisory Group
November 15, 2018

Jurisdiction Attendees: Brenna Fall, Matt Myers, Kent Ellis, Chuck Hinz, Kesha Billings, Kim Downs, Brent Oleson

Corridor MPO Attendees: Bill Micheel, Hilary Hershner, Brandon Whyte, Liz Darnall
Consultant Attendees: Jeff Morrow, Michaela LeClair, Megan Moffitt, Mike Kurek
Absent: Mike Barkalow, John Bender, Brad Ketels, John Witt

1. PowerPoint Presentation
a. Project Summary: Where we are
i. Plan approaching completion
ii. Public meeting completed
iii. Jurisdiction comments incorporated into report
iv. Decision needed regarding l-380 trail crossing options
2. At-grade crossing
3. Grade-separated crossing
4. At-grade, signalized crossing (new option from lowa DOT)
b. Project Summary: I-380 trail crossing option
i. Discussed the lowa DOT project and options provided
ii. Iowa DOT has verbally agreed to provide a feasibility analysis and cost estimate
iii. All agreed this would be a good option and provide the best information to make decisions
iv. Written request will be made to lowa DOT to do feasibility analysis and cost estimate
c. Project Summary: What needs to be done
i. Iowa DOT to provide feasibility analysis and cost estimate
ii. Iowa DOT public involvement tentatively set for January 22, 2019
iii. Advisory Group meeting shortly after lowa DOT public involvement
iv. Discussed process for plan update adoption
d. Public Involvement: Open House
i. Open house summary provided
5. Attendance estimated at 300
6. Presentation at $5: 15$ and 6 p.m.
7. Boards: 12 stations with a mix of education and preference boards
a. Median treatments preference board: Grass (19); Native/Pollinator (81); Mix (13)
b. I-380 Crossing: At-Grade (7); Underpass (120)
c. Cedar Valley Nature Trail: At-Grade (6); Underpass (116)
8. Comment Forms: 56 total comments
a. From Open House: 51 (12 with follow up provided)
b. Other Comments: 5 ( 2 with follow up provided)
9. Most common comments:
a. In favor of pedestrian underpass at I-380 (41)
b. In favor of pedestrian underpass at Cedar Valley Nature Trail (19)
c. Build Tower Terrace Road as four-lane now (5)
d. Keep bike lanes on Tower Terrace Road under four-lane scenario (4)
e. Accelerate the schedule (4)
10. Discussed that public involvement will be incorporated into the plan
11. Next Steps
a. Plan approaching completion
b. Iowa DOT to prepare feasibility analysis and cost estimate
c. Incorporate public involvement into final report
d. Adopt Corridor Management Plan Update
e. Implement

From: Nicholas Burwell [mailto:Nicholas.Burwell@cn.ca]
Sent: Monday, April 30, 2018 3:26 PM
To: Jeff Morrow <jmorrow @anderson-bogert.com>
Subject: RE: Tower Terrace Road in Robins Iowa
Jeff,

CCP is opposed to adding new at grade crossings, if a new grade crossing is required with this project it should be considered as a grade separation. If a grade separation is not elected CCP would consider a new crossing if 2 crossing closures are offered in the same region of the state on CCP.

From: Jeff Morrow [mailto:jmorrow@anderson-bogert.com]
Sent: Monday, March 26, 2018 5:20 PM
To: Nicholas Burwell [Nicholas.Burwell@cn.ca](mailto:Nicholas.Burwell@cn.ca)
Subject: Tower Terrace Road in Robins Iowa

Hi Nick -

I am working with the Cities of Hiawatha, Robins, Cedar Rapids, and Marion on a new roadway corridor that will cross the CN railroad at the location shown in the attached aerial photo. The proposal is for an at-grade crossing. Tower Terrace Road is an arterial roadway. The current plan is for a two-lane road, but ultimately could be widened to the interior to a four lane roadway section. I have also included a typical section of Tower Terrace Road.

The overall Tower Terrace Road project extends from IA Highway 13 in Marion, west to I-380 in Hiawatha. This particular rail crossing is located in the City of Robins.

We are in the early planning stages of the project and we need to work with CN Railroad to develop this crossing concept. Can you tell me what the process and costs (order of magnitude) would be to construct a new at-grade railroad crossing of CN Track at this location? Please let me know if you have questions or need additional information.

Thanks,

## Jeff Morrow

## ANDERSONTBOGERT

4001 River Ridge Drive NE, Cedar Rapids, IA 52402
jmorrow @anderson-bogert.com | http://www.anderson-bogert.com

| 319.377 .4629 | Office |
| :--- | :--- |
| 319.361 .0534 | Cell |
| 319.377 .8498 | Fax |

From: Nicholas Burwell [mailto:Nicholas.Burwell@cn.ca]
Sent: Monday, April 30, 2018 4:42 PM
To: Jeff Morrow <jmorrow @anderson-bogert.com>
Subject: clearance diagram

1. Roadbed-
a. Assumed typical section: (may be revised per geotechnical recommendations)
i. 115 lb rail
ii. 7"x9"x8.5' wood ties @ 19.5" O.C.
iii. $12^{\prime \prime}$ minimum ballast undertie
iv. $12^{\prime \prime}$ minimum subballast
v. Trackside ditches where necessary to convey drainage
2. $3^{\prime}$ deep $\times 4^{\prime}$ flat bottom minimum
3. $3^{\prime}$ deep $\times 10^{\prime}$ flat bottom preferred
4. Clearances-
a. $23^{\prime}-0^{\prime \prime}$ minimum vertical clearance at overpasses in final alignment
b. $34^{\prime}-0^{\prime \prime}$ minimum horizontal clearance to pier footing at overpasses (protected) in final alignment

Without an exact crossing length to figure the estimate on, you can use about $\$ 2000 / \mathrm{ft}$ for crossings wider than 50 feet as a rough estimate, without signals, lights and gates. Rough estimate forsignals, lights, and gates for a 2 lane road is $\$ 250 \mathrm{~K}$ could be more depending upon power availability, terrain for placement of bungalow and signal masts, etc.


Clearance Diagram

## OFFICE OF THE ASSISTANT CHIEF ENGINEER - STRUCTURES

## Feb. 2008

## Submission and Design Guidelines for Crash Walls

## 1. Covering Letter and Required Documentation for review by CN Structures-Edmonton

- Summary of items enclosed,
- A Location or Key Plan to be used to identify the mileage and subdivision, the classification of the rail line, and the maximum speed for freight and passenger rail traffic, on CN-owned or operated corridors.
- Name, phone, fax and e-mail address of contact.

2. Geotechnical Report

- Soil properties used in design, and how determined,
- Borehole logs including location plan, if required to support these properties,
- Narrative report describing soil and ground water conditions, if required as above.


## 3. Design of Crash Walls

- Calculations analyzing proposed crash wall for Load Cases 1 to 4, considered representative of a derailed train, signed and sealed by a professional engineer.
- Freight Train Load Case 1 - Glancing Blow: three locomotives weighing 200 tons each plus six cars weighing 143 tons each, impacting the wall at 10 degrees to the wall,
- Freight Train Load Case 2 - Direct Impact: single car weighing 143 tons impacting the wall at 90 degrees to the wall.
- Passenger Train Load Case 3 - Glancing Blow: two locomotives weighing 118 tons plus six cars weighing 74 tons each impacting the wall at 10 degrees to the wall.
- Passenger Train Load Case 4 - Direct Impact: single locomotive weighing 118 tons impacting the wall at 90 degrees to the wall.
- The analysis should reflect the specified track speeds for passenger and/or freight trains applicable within the subject corridor.
- To assist in designing the structure for the above load cases, use:
o Speed of derailed equipment impacting the wall = appropriate track speed,
o Height of application of impact force $=3$ feet above ground
o Minimum height of wall facing tracks $=7$ feet above top of rail elevation.
- For energy dissipation, assume:
o Plastic deformation of individual car due to direct impact $=1$ foot (maximum),
o Total compression of linkages and equipment of the two or three locomotive and six car consist = 10 feet (maximum),
o Deflection of wall to be determined by the designer.
- The design must incorporate horizontal and vertical continuity to distribute the loads from the derailed train.

4. Drawings - (2 hard copies as well as .pdf format)

- Site plan clearly showing property line, location of wall structure, centre-line and elevation of nearest rail track,
- Layout and structural details of proposed structure, including all material notes and specs and construction procedures/phasing. All drawings signed and sealed by a professional engineer.
- Extent and treatment of any temporary excavations on railway property.


## 5. Fees

A review fee of $\$ 2500$ plus GST covers the cost of a standard review. If additional submissions, site visits, meetings, review of more than one alternative or unusually complex designs are involved, additional fees may be requested.
6. Post-Construction Certificate

- Engineer's certificate of completion describing actual construction, and certifying that the structure was built as per approved drawings,
- Copy of as-built drawings, as part of the engineer's certification of completion


## Access to Railway Operating Rights-of-Way

Permits MUST be obtained before entering into any Railway Operating right-of-way.
Some or all of the following may also be required: - proper railway flagging protection, cable locates, liability insurance, release of liability, safety training.

CN will provide guidance as to the proper process to be followed in this regard.

## Communication for Submissions

All correspondence during the review process should be directed to the appropriate divisional Technical Services Department.

The railway will notify the applicant when the report has been reviewed and accepted.

## Liability and Responsibility

The review will be undertaken with the understanding that neither the railway nor its consultants shall have any responsibility nor liability whatsoever for the design or adequacy of the crash wall, notwithstanding that any plans or specifications may have been reviewed by the railway or its consultants. No such review shall be deemed to limit the applicant's full responsibility for the design and construction adequacy of the works.

Office of the Assistant Chief Engineer
Edmonton, Alberta
Feb. 2008

## APPENDIX <br> COST OPINION: EDGEWOOD ROAD TO WEST EDGE OF I-380 INTERCHANGE

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM EDGEWOOD ROAD TO WEST EDGE OF I-380 INTERCHANGE |  |  |  |  |  | Project 1 <br> $07-14-18$ <br> cosTs |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \hline \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  |  |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 10,000 | \$ | 10,000 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 30000 | \$ | 5 | \$ | 150,000 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 7800 | \$ | 7 | \$ | 50,700 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 2050 | \$ | 3 | \$ | 6,150 |
| 5 | MODIFIED SUBBASE | CY | 4500 | \$ | 40 | \$ | 180,000 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 83 | \$ | 450 | \$ | 37,350 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9' | SY | 20500 | \$ | 45 | \$ | 922,500 |
| 8 | MEDIAN, PCC, 6" | SY | 225 | \$ | 86 | \$ | 19,350 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | HMA (1M ESAL) BASE, 3/4" (8" THICK) | TON | 2115 | \$ | 62 | \$ | 131,130 |
| 11 | HMA (1M ESAL) SURF, 1/2", NO FRIC (2" THICK) | TON | 535 | \$ | 58 | \$ | 31,030 |
| 12 | ASPH BINDER, PG 58-28 | TON | 159 | \$ | 570 | \$ | 90,630 |
| 13 | HMA PAV'T SAMPLE | LS | 1 | \$ | 4,000 | \$ | 4,000 |
| 14 | HMA, DRIVEWAY | SY | 500 | \$ | 66 | \$ | 33,000 |
| 15 | GRANULAR BACKFILL | CY | 5460 | \$ | 33 | \$ | 180,180 |
| 16 | APRON, CONC | EACH | 8 | \$ | 1,500 | \$ | 12,000 |
| 17 | INTAKE, SW-510 | EACH | 70 | \$ | 6,500 | \$ | 455,000 |
| 18 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 8300 | \$ | 11 | \$ | 91,300 |
| 19 | SUBDRAIN OUTLET (RF-19C) | EACH | 70 | \$ | 300 | \$ | 21,000 |
| 20 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 5,900 | \$ | 70 | \$ | 413,000 |
| 21 | ENGINEER FABRIC | SY | 800 | \$ | 4 | \$ | 3,000 |
| 22 | REVETMENT, CLASS E | TON | 128 | \$ | 44 | \$ | 5,632 |
| 23 | RMVL OF PAV'T | SY | 17200 | \$ | 16 | \$ | 275,200 |
| 24 | RECREATIONAL TRAIL, PCC, ${ }^{\prime \prime}$ | SY | 1100 | \$ | 35 | \$ | 38,500 |
| 25 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 10 | \$ | 440 | \$ | 4,400 |
| 26 | SIDEWALK, PCC, 4" | SY | 1390 | \$ | 45 | \$ | 62,550 |
| 27 | SIDEWALK, PCC, 6 " | SY | 40 | \$ | 85 | \$ | 3,400 |
| 28 | DETECTABLE WARNING - CURB RAMP | SF | 150 | \$ | 37 | \$ | 5,550 |
| 29 | DRIVEWAY, P.C. CONCRETE, 8 IN | SY | 120 | \$ | 65 | \$ | 7,800 |
| 30 | RMVL OF PAVED DRIVEWAY | SY | 120 | \$ | 12 | \$ | 1,440 |
| 31 | LIGHTING POLES | EACH | 40 | \$ | 5,000 | \$ | 200,000 |
| 32 | ELECTRICAL CIRCUIT | LF | 4,150 | \$ | 13 | \$ | 53,950 |
| 33 | HANDHOLE AND JUNCTION BOX | EACH | 6 | \$ | 900 | \$ | 5,400 |
| 34 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 300 | \$ | 22 | \$ | 6,600 |
| 35 | TYPE A SIGN, SHEET ALUM | SF | 60 | \$ | 22 | \$ | 1,320 |
| 36 | TRAFFIC SIGNALIZATION | EACH | 1 | \$ | 300,000 | \$ | 300,000 |
| 37 | CONSTRUCTION SURVEY | LS | 1 | \$ | 50,000 | \$ | 50,000 |
| 38 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 135 | \$ | 175 | \$ | 23,625 |
| 39 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 36 | \$ | 120 | \$ | 4,320 |
| 40 | GROOVE CUT - PAV'T MARK | STA | 135 | \$ | 55 | \$ | 7,425 |
| 41 | GROOVE CUT - SYMBOL+LEGEND | EACH | 36 | \$ | 115 | \$ | 4,140 |
| 42 | TRAFFIC CONTROL | LS | 1 | \$ | 150,000 | \$ | 150,000 |
| 43 | FLAGGER | EACH | 40 | \$ | 425 | \$ | 17,000 |
| 44 | MOBILIZATION | LS | 1 | \$ | 200,000 | \$ | 200,000 |
| 45 | MODULAR BLOCK RETAIN WALL | SF | 300 | \$ | 100 | \$ | 30,000 |
| 46 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 | \$ | 8,500 |
| 47 | ADJUST FIRE HYDRANT | EACH | 2 | \$ | 3,500 | \$ | 7,000 |
| 48 | FIRE HYDRANT ASSEMBLIES | EACH | 2 | \$ | 4,800 | \$ | 9,600 |
| 49 | GATE VALVE+VALVE BOX, 8" | EACH | 2 | \$ | 1,700 | \$ | 3,400 |
| 50 | WATER MAIN, DUCTILE IRON, 8' | LF | 3,125 | \$ | 77 | \$ | 240,625 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM EDGEWOOD ROAD TO WEST EDGE OF I-380 INTERCHANGE |  |  |  |  |  | $\begin{gathered} \hline \hline \text { Project } 1 \\ \hline 07-14-18 \\ \hline \hline \text { CosTs } \end{gathered}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  |  |  |
| 51 | WATER MAIN FITTING | LB | 9375 | \$ | 10 | \$ | 93,750 |
| 52 | TAPPING SLEEVE+VALVE | EACH | 2 | \$ | 3,250 | \$ | 6,500 |
| 53 | DECORATIVE BRICK PAVERS | SY | 300 | \$ | 125 | \$ | 37,500 |
| 54 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 500 | \$ | 26 | \$ | 13,000 |
| 55 | MOW | ACRE | 15 | \$ | 150 | \$ | 2,250 |
| 56 | MULCH | ACRE | 5 | \$ | 700 | \$ | 3,500 |
| 57 | SEED+FERTILIZE (URBAN) | ACRE | 5 | \$ | 2,800 | \$ | 14,000 |
| 58 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 5 | \$ | 2,000 | \$ | 10,000 |
| 59 | SILT FENCE | LF | 6225 | \$ | 3 | \$ | 18,675 |
| 60 | SILT FENCE-DITCH CHECKS | LF | 620 | \$ | 3 | \$ | 1,550 |
| 61 | SILT BASIN | EACH | 4 | \$ | 400 | \$ | 1,600 |
| 62 | RMVL OF SILT FENCE | LF | 6225 | \$ | 1 | \$ | 6,225 |
| 63 | RMVL OF SILT FENCE-DITCH CHECK | LF | 620 | \$ | 1 | \$ | 620 |
| 64 | CLEAN-OUT OF SILT FENCE | LF | 3112.5 | \$ | 2 | \$ | 4,669 |
| 65 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 310 | \$ | 2 | \$ | 465 |
| 66 | MULCH, SHREDDED BARK | CY | 412 | \$ | 45 | \$ | 18,540 |
| 67 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 300 | \$ | 50 | \$ | 15,000 |
| 68 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 312 | \$ | 250 | \$ | 78,000 |


| Sub-Total Construction: | $\$$ | $4,897,540$ |
| ---: | :--- | ---: |
| Incentives: | $\$$ | 82,280 |
| Contingency (15\%): | $\$$ | 734,600 |
| Total Construction: | $\$$ | $5,714,420$ |
| Engineering (15\%) | $\$$ | 857,200 |
| Right-of-way: | $\$$ | 806,304 |
| Underground Electric: | $\$$ | 300,000 |
| Construction Admin (9\%): | $\$$ | 514,000 |
| TOTALS: | $\$$ | $8,191,924$ |

FEDERAL AID (OR SWAP) ELIGIBLE COSTS
Total Costs: \$ 8,191,924
Less Utilities: \$ $(369,375)$
Less Engineering/Construction Admin:

Less Underground Electric: | $\$$ |
| ---: |
| $\$$ |

Maximum STBG Request (80\%): \$ 4,921,079
20\% Match: \$ 1,230,270

## APPENDIX <br> COST OPINION: EAST EDGE OF I-380 INTERCHANGE TO CENTER POINT ROAD

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM EAST EDGE OF I380 INTERCHANGE TO CENTER POINT ROAD |  |  |  |  |  | $\begin{gathered} \hline \hline \text { Project } 2 \\ \hline \hline 07-17-18 \\ \hline \hline \text { Costs } \end{gathered}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY |  | PRICE |  |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 10,000 | \$ | 10,000 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 10321 | \$ | 5 | \$ | 51,605 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 5300 | \$ | 7 | \$ | 34,450 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 1326 | \$ | 3 | \$ | 3,978 |
| 5 | MODIFIED SUBBASE | CY | 2004 | \$ | 40 | \$ | 80,160 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 33.6 | \$ | 450 | \$ | 15,120 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9" | SY | 13260 | \$ | 45 | \$ | 596,700 |
| 8 | MEDIAN, PCC, 6" | SY | 100 | \$ | 86 | \$ | 8,600 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | HMA, DRIVEWAY | SY | 500 | \$ | 66 | \$ | 33,000 |
| 11 | GRANULAR BACKFILL | CY | 2710 | \$ | 33 | \$ | 89,430 |
| 12 | APRON, CONC | EACH | 2 | \$ | 1,500 | \$ | 3,000 |
| 13 | INTAKE, SW-510 | EACH | 50 | \$ | 6,500 | \$ | 325,000 |
| 14 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 3360 | \$ | 11 | \$ | 36,960 |
| 15 | SUBDRAIN OUTLET (RF-19C) | EACH | 50 | \$ | 300 | \$ | 15,000 |
| 16 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 2,930 | \$ | 70 | \$ | 205,100 |
| 17 | ENGINEER FABRIC | SY | 200 | \$ | 4 | \$ | 750 |
| 18 | REVETMENT, CLASS E | TON | 32 | \$ | 44 | \$ | 1,408 |
| 19 | RMVL OF PAV'T | SY | 4850 | \$ | 16 | \$ | 77,600 |
| 20 | RECREATIONAL TRAIL, PCC, ${ }^{\prime \prime}$ | SY | 1530 | \$ | 35 | \$ | 53,550 |
| 21 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 13.8 | \$ | 440 | \$ | 6,072 |
| 22 | SIDEWALK, PCC, ${ }^{\prime \prime}$ | SY | 210 | \$ | 45 | \$ | 9,450 |
| 23 | SIDEWALK, PCC, ${ }^{\prime \prime}$ | SY | 12 | \$ | 85 | \$ | 1,020 |
| 24 | DETECTABLE WARNING - CURB RAMP | SF | 130 | \$ | 37 | \$ | 4,810 |
| 25 | DRIVEWAY, P.C. CONCRETE, 8 IN | SY | 40 | \$ | 65 | \$ | 2,600 |
| 26 | RMVL OF PAVED DRIVEWAY | SY | 250 | \$ | 12 | \$ | 3,000 |
| 27 | LIGHTING POLES | EACH | 20 | \$ | 5,000 | \$ | 100,000 |
| 28 | ELECTRICAL CIRCUIT | LF | 1,680 | \$ | 13 | \$ | 21,840 |
| 29 | HANDHOLE AND JUNCTION BOX | EACH | 6 | \$ | 900 | \$ | 5,400 |
| 30 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 300 | \$ | 22 | \$ | 6,600 |
| 31 | TYPE A SIGN, SHEET ALUM | SF | 60 | \$ | 22 | \$ | 1,320 |
| 32 | TRAFFIC SIGNALIZATION | EACH | 1 | \$ | 300,000 | \$ | 300,000 |
| 33 | CONSTRUCTION SURVEY | LS | 1 | \$ | 30,000 | \$ | 30,000 |
| 34 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 55 | \$ | 175 | \$ | 9,625 |
| 35 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 12 | \$ | 120 | \$ | 1,440 |
| 36 | GROOVE CUT - PAV'T MARK | STA | 55 | \$ | 55 | \$ | 3,025 |
| 37 | GROOVE CUT - SYMBOL+LEGEND | EACH | 12 | \$ | 115 | \$ | 1,380 |
| 38 | TRAFFIC CONTROL | LS | 1 | \$ | 100,000 | \$ | 100,000 |
| 39 | FLAGGER | EACH | 60 | \$ | 425 | \$ | 25,500 |
| 40 | MOBILIZATION | LS | 1 | \$ | 200,000 | \$ | 200,000 |
| 41 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 |  | 8,500 |
| 42 | MANHOLE, SANITARY SEWER, SW-301, 60 IN. | EACH | 3 | \$ | 8,500 | \$ | 25,500 |
| 43 | SANITARY SEWER GRAVITY MAIN, TRENCHED, 8 IN. | LF | 850 | \$ | 100 |  | 85,000 |
| 44 | DECORATIVE BRICK PAVERS | SY | 200 | \$ | 125 | \$ | 25,000 |
| 45 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 500 | \$ | 26 | \$ | 13,000 |
| 46 | MOW | ACRE | 9 | \$ | 150 | \$ | 1,350 |
| 47 | MULCH | ACRE | 3 | \$ | 700 | \$ | 2,100 |
| 48 | SEED+FERTILIZE (URBAN) | ACRE | 3 | \$ | 2,800 | \$ | 8,400 |
| 49 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 3 | \$ | 2,000 | \$ | 6,000 |
| 50 | SILT FENCE | LF | 2520 | \$ | 3 | \$ | 7,560 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM EAST EDGE OF 1380 INTERCHANGE TO CENTER POINT ROAD |  |  |  |  | Project 2 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \hline \text { ITEM } \\ & \text { NO. } \\ & \hline \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  | OSTS |
| 51 | SILT FENCE-DITCH CHECKS | LF | 250 | \$ 3 | \$ | 625 |
| 52 | SILT BASIN | EACH | 4 | \$ 400 | \$ | 1,600 |
| 53 | RMVL OF SILT FENCE | LF | 2520 | \$ 1 | \$ | 2,520 |
| 54 | RMVL OF SILT FENCE-DITCH CHECK | LF | 250 | \$ 1 | \$ | 250 |
| 55 | CLEAN-OUT OF SILT FENCE | LF | 1260 | \$ 2 | \$ | 1,890 |
| 56 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 125 | \$ 2 | \$ | 188 |
| 57 | MULCH, SHREDDED BARK | CY | 159.3333333 | \$ 45 | \$ | 7,170 |
| 58 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 100 | \$ 50 | \$ | 5,000 |
| 59 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 126 | \$ 250 | \$ | 31,500 |
|  |  |  |  | Sub-Total Construction: \$ 2710,650 | \$ | 2,710,650 |
|  |  |  |  | Incentives: | \$ | 41,770 |
|  |  |  |  | Contingency (15\%): | \$ | 406,600 |
|  |  |  |  | Total Construction: | \$ | 3,159,020 |
|  |  |  |  | Engineering (15\%) | \$ | 473,900 |
|  |  |  |  | Right-of-way: | \$ | 106,100 |
|  |  |  |  | derground Electric: | \$ | 300,000 |
|  |  |  | Cons | truction Admin (9\%) | \$ | 284,000 |
|  |  |  |  | TOTALS: | \$ | 4,323,020 |
| FEDERAL AID (OR SWAP) ELIGIBLE COSTS |  |  |  |  |  |  |
|  |  |  |  | Total Costs: | \$ | 4,323,020 |
|  |  |  | Less | Construction Admin: | \$ | $(284,000)$ |
|  |  |  |  | Less Utilities: | \$ | $(119,000)$ |
|  |  |  | Less U | derground Electric: | \$ | $(300,000)$ |
|  |  |  |  | TBG Eligible Costs: | \$ | 3,620,020 |
|  |  |  | Maximum ST | BG Request (80\%): | \$ | 2,896,016 |
|  |  |  |  | 20\% Match: | \$ | 724,004 |

## APPEDDK COST OPINION: CENTER POINT ROAD TO STAMY ROAD

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROMCENTER POINT ROAD TO STAMY ROAD |  |  |  |  |  |  |  |  |  |  |  | Project 3 <br> 06-28-18 <br> cosTs |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ITEM  <br> NO. ITEM |  | UNIT |  |  | QUANTITY | UNIT PRICE |  |  |  |  |  |  |  |
|  |  |  | HIAWATHA | ROBINS | TOTAL |  |  | HIAWATHA |  | ROBINS |  | TOTAL |  |
| 1 | CLEAR+GRUBB | LS | 0.6 | 0.4 | 1.0 | \$ | 8,000 | \$ | 4,800 | \$ | 3,200 | \$ | 8,000 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 5762.4 | 3841.6 | 9604 | \$ | 5 | \$ | 28,812 | \$ | 19,208 | \$ | 48,020 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 2820 | 1880 | 4700 | \$ | 7 | \$ | 18,330 | \$ | 12,220 | \$ | 30,550 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 409 | 314 | 723 | \$ | 3 | \$ | 1,227 | \$ | 942 | \$ | 2,169 |
| 5 | MODIFIED SUBBASE | CY | 890 | 680 | 1570 | \$ | 40 | \$ | 35,600 | \$ | 27,200 | \$ | 62,800 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 36 | 20 | 56 | \$ | 450 | \$ | 16,200 | S | 9,000 | \$ | 25,200 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9' | SY | 4092.5 | 3142.5 | 7235.0 | \$ | 45 | \$ | 184,163 | S | 141,413 | \$ | 325,575 |
| 8 | MEDIAN, PCC, $6^{\prime \prime}$ | SY | 0 | 100 | 100.0 | \$ | 86 | \$ |  | S | 8,600 | \$ | 8,600 |
| 9 | PCC PAV'T SAMPLE | LS | 0.6 | 0.4 | 1.0 | \$ | 3,000 | \$ | 1,800 | S | 1,200 | \$ | 3,000 |
| 10 | HMA, DRIVEWAY | SY | 100.0 | 0.0 | 100.0 | \$ | 66 | \$ | 6,600 | \$ |  | \$ | 6,600 |
| 11 | GRANULAR BACKFILL | CY | 2330 | 1360 | 3690 | \$ | 33 | \$ | 76,890 | \$ | 44,880 | \$ | 121,770 |
| 12 | APRON, CONC | EACH | 2 | 2 | 4 | \$ | 1,500 | \$ | 3,000 | \$ | 3,000 | \$ | 6,000 |
| 13 | INTAKE, SW-510 | EACH | 30 | 20 | 80 | \$ | 6,500 | \$ | 195,000 | \$ | 130,000 | \$ | 520,000 |
| 14 | SUBDRAIN, LONGITUDINAL, (SHLD) $6^{\prime \prime}$ | LF | 3630 | 2030 | 5660 | \$ | 11 | \$ | 39,930 | \$ | 22,330 | \$ | 62,260 |
| 15 | SUBDRAIN OUTLET (RF-19C) | EACH | 30 | 20 | 80 | \$ | 300 | \$ | 9,000 | \$ | 6,000 | \$ | 24,000 |
| 16 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 2,515 | 1,465 | 3,980 | \$ | 70 | \$ | 176,050 | \$ | 102,550 | \$ | 278,600 |
| 17 | ENGINEER FABRIC | SY | 200 | 200 | 400 | \$ | 4 | \$ | 750 | \$ | 750 | \$ | 1,500 |
| 18 | REVETMENT, CLASS E | TON | 32 | 32 | 64 | \$ | 44 | \$ | 1,408 | \$ | 1,408 | \$ | 2,816 |
| 19 | RMVL OF PAV'T | SY | 655 | 320 | 975 | \$ | 16 | \$ | 10,480 | \$ | 5,120 | \$ | 15,600 |
| 20 | RECREATIONAL TRAIL, PCC, 5 " | SY | 2400 | 1800 | 5400 | \$ | 35 | \$ | 84,000 | \$ | 63,000 | \$ | 189,000 |
| 21 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 21.6 | 16.2 | 37.8 | \$ | 440 | \$ | 9,504 | \$ | 7,128 | \$ | 16,632 |
| 22 | SIDEWALK, PCC, $4^{\prime \prime}$ | SY | 100 | 44 | 356 | \$ | 45 | \$ | 4,500 | \$ | 1,980 | \$ | 16,020 |
| 23 | SIDEWALK, PCC, $6^{\text {² }}$ | SY | 19 | 25 | 44 | \$ | 85 | \$ | 1,615 | \$ | 2,125 | \$ | 3,740 |
| 24 | DETECTABLE WARNING - CURB RAMP | SF | 56 | 72 | 128 | \$ | 37 | \$ | 2,072 | \$ | 2,664 | \$ | 4,736 |
| 25 | DRIVEWAY, P.C. CONCRETE, 8 IN | SY | 260 | 0 | 260 | \$ | 65 | \$ | 16,900 | \$ | - | \$ | 16,900 |
| 26 | RMVL OF PAVED DRIVEWAY | SY | 260 | 0 | 260 | \$ | 12 | \$ | 3,120 | \$ | - | \$ | 3,120 |
| 27 | LIGHTING POLES | EACH | 20 | 10 | 30 | \$ | 5,000 | \$ | 100,000 | \$ | 50,000 | \$ | 150,000 |
| 28 | ELECTRICAL CIRCUIT | LF | 1,965 | 965 | 2,430 | \$ | 13 | \$ | 25,545 | \$ | 12,545 | \$ | 31,590 |
| 29 | HANDHOLE AND JUNCTION BOX | EACH | 4 | 2 | 6 | \$ | 900 | \$ | 3,600 | \$ | 1,800 | \$ | 5,400 |
| 30 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 180 | 120 | 300 | \$ | 22 | \$ | 3,960 | \$ | 2,640 | \$ | 6,600 |
| 31 | TYPE A SIGN, SHEET ALUM | SF | 36 | 24 | 60 | \$ | 22 | \$ | 792 | \$ | 528 | \$ | 1,320 |
| 32 | CONSTRUCTION SURVEY | LS | 0.6 | 0.4 | 1 | \$ | 50,000 | \$ | 30,000 | \$ | 20,000 | \$ | 50,000 |
| 33 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 48 | 33 | 81 | S | 175 | \$ | 8,400 | \$ | 5,775 | \$ | 14,175 |
| 34 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 4 | 4 | 8 | \$ | 120 | \$ | 480 | \$ | 480 | \$ | 960 |
| 35 | GROOVE CUT - PAV'T MARK | STA | 48 | 33 | 81 | \$ | 55 | \$ | 2,640 | \$ | 1,815 | \$ | 4,455 |
| 36 | GROOVE CUT - SYMBOL+LEGEND | EACH | 4 | 4 | 8 | \$ | 115 | \$ | 460 | \$ | 460 | \$ | 920 |
| 37 | TRAFFIC CONTROL | LS | 0.6 | 0.4 | 1 | \$ | 100,000 | \$ | 60,000 | \$ | 40,000 | \$ | 100,000 |
| 38 | FLAGGER | EACH | 30 | 20 | 50 | \$ | 425 | \$ | 12,750 | \$ | 8,500 | \$ | 21,250 |
| 39 | MOBILIZATION | LS | 0.6 | 0.4 | 1 | \$ | 200,000 | \$ | 120,000 | \$ | 80,000 | \$ | 750,000 |
| 40 | TRENCH COMPACTION TESTING | LS | 1.0 | 0.0 | 1 | \$ | 8,500 | \$ | 8,500 | \$ |  | \$ | 8,500 |
| 41 | MANHOLE, SANITARY SEWER, SW-301, 60 IN . | EACH | 7 | 0 | 7 | \$ | 8,500 | \$ | 59,500 | \$ | - | \$ | 59,500 |
| 42 | SANITARY SEWER GRAVITY MAIN, TRENCHED, 8 IN . | LF | 2400 | 0 | 2400 | \$ | 100 | \$ | 240,000 | \$ | - | \$ | 240,000 |
| 43 | DECORATIVE BRICK PAVERS | SY | 50 | 50 | 100 | \$ | 125 | \$ | 6,250 | \$ | 6,250 | \$ | 12,500 |
| 44 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 50 | 50 | 100 | \$ | 26 | \$ | 1,300 | \$ | 1,300 | \$ | 2,600 |
| 45 | MOW | ACRE | 9 | 6 | 15 | \$ | 150 | \$ | 1,350 | \$ | 900 | \$ | 2,250 |
| 46 | MULCH | ACRE | 3 | 2 | 5 | \$ | 700 | \$ | 2,100 | \$ | 1,400 | \$ | 3,500 |
| 47 | SEED+FERTILIZE (URBAN) | ACRE | 3 | 2 | 5 | \$ | 2,800 | \$ | 8,400 | \$ | 5,600 | \$ | 14,000 |
| 48 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 3 | 2 | 5 | \$ | 2,000 | \$ | 6,000 | \$ | 4,000 | \$ | 10,000 |
| 49 | SILT FENCE | LF | 2723 | 1523 | 4246 | \$ | 3 | \$ | 8,169 | \$ | 4,569 | \$ | 12,738 |
| 50 | SILT FENCE-DITCH CHECKS | LF | 270 | 150 | 420 | \$ | 3 | \$ | 675 | \$ | 375 | \$ | 1,050 |



## APPEDAK COST OPINION: EAST OF STAMY ROAD THROUGH ROBINS ROAD



| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM EAST OF STAMY ROAD THROUGH ROBINS ROAD |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \hline \text { Project 4 } \\ & \hline 06-28-18 \\ & \hline \end{aligned}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{gathered} \hline \text { ITEM } \\ \text { NO. } \\ \hline \end{gathered}$ | ITEM | UNIT |  |  | QUANTITY | UNIT PRICE |  |  |  |  |  | costs |
|  |  |  | HIAWATHA | ROBINS | TOTAL |  |  | IAWATHA |  | ROBINS |  | TOTAL |
| 51 | DECORATIVE BRICK PAVERS | SY | 150 | 150 | 300 | \$ 125 | \$ | 18,750 | \$ | 18,750 | \$ | 37,500 |
| 52 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 250 | 250 | 500 | \$ 26 | \$ | 6,500 | \$ | 6,500 | \$ | 13,000 |
| 53 | MOW | ACRE | 12 | 12 | 24 | \$ 150 | \$ | 1,800 | \$ | 1,800 | \$ | 3,600 |
| 54 | MULCH | ACRE | 4 | 4 | 8 | 700 | \$ | 2,800 | \$ | 2,800 | \$ | 5,600 |
| 55 | SEED+FERTILIZE (URBAN) | ACRE | 4 | 4 | 8 | \$ 2,800 | \$ | 11,200 | \$ | 11,200 | \$ | 22,400 |
| 56 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 4 | 4 | 8 | \$ 2,000 | \$ | 8,000 | \$ | 8,000 | \$ | 16,000 |
| 57 | SILT FENCE | LF | 3263.5 | 3263.5 | 6527 | \$ 3 | \$ | 9,791 | \$ | 9,791 | \$ | 19,581 |
| 58 | SILT FENCE-DITCH CHECKS | LF | 325 | 325 | 650 | \$ 3 | \$ | 813 | \$ | 813 | \$ | 1,625 |
| 59 | SILT BASIN | EACH | 2 | 2 | 4 | \$ 400 | \$ | 800 | \$ | 800 | \$ | 1,600 |
| 60 | RMVL OF SILT FENCE | LF | 3263.5 | 3263.5 | 6527 | \$ | \$ | 3,264 | \$ | 3,264 | \$ | 6,527 |
| 61 | RMVL OF SILT FENCE-DITCH CHECK | LF | 325 | 325 | 650 | \$ | \$ | 325 | \$ | 325 | \$ | 650 |
| 62 | CLEAN-OUT OF SILT FENCE | LF | 1631.75 | 1631.75 | 3263.5 | \$ 2 | \$ | 2,448 | \$ | 2,448 | \$ | 4,895 |
| 63 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 162.5 | 162.5 | 325 | \$ 2 | \$ | 244 | \$ | 244 | \$ | 488 |
| 64 | MULCH, SHREDDED BARK | CY | 173.5 | 173.5 | 347 | \$ 45 | \$ | 7,808 | \$ | 7,808 | \$ | 15,615 |
| 65 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 25 | 25 | 50 | \$ 50 | \$ | 1,250 | \$ | 1,250 | \$ | 2,500 |
| 66 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 165 | 165 | 330 | 250 | \$ | 41,250 | \$ | 41,250 | \$ | 82,500 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | Sub-To | Incentives: | \$ | $\begin{array}{r} 624,99 \\ 31,180 \end{array}$ | \$ | $\begin{array}{r} 32,140 \\ 31,180 \end{array}$ | \$ | $\begin{array}{r} 4,952,, 360 \\ 62,360 \end{array}$ |
|  |  |  |  |  |  | tingency (15\%): | \$ | 393,700 | \$ | 349,100 | s | 742,800 |
|  |  |  |  |  |  | al Construction: | \$ | 3,049,875 | \$ | 2,707,420 | \$ | 5,757,296 |
|  |  |  |  |  |  | gineering ( $15 \%$ ) | \$ | 457,500 | \$ | 406,100 |  | 863,600 |
|  |  |  |  |  |  | Right-of-way: | \$ | 92,338 | \$ | 52,758 | \$ | 145,095 |
|  |  |  |  |  | Unde | ground Electric: | \$ | - | \$ | - | \$ | - |
|  |  |  |  |  | Construc | ion Admin (9\%) | \$ | 274,000 | \$ | 244,000 | S | 518,000 |
|  |  |  |  |  |  | TOTALS: | \$ | 3,873,713 | \$ | 3,410,278 | \$ | 7,283,991 |
| FEDERAL AID (OR SWAP) ELIGIBLE COSTS |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | Total Costs: | \$ | 3,873,713 | \$ | 3,410,278 | \$ | 7,283,991 |
|  |  |  |  |  |  | Less Utilities: | \$ | $(289,500)$ | \$ | - | \$ | $(289,500)$ |
|  |  |  |  |  | Less Con | truction Admin: | \$ | $(274,000)$ | \$ | $(244,000)$ | \$ | $(518,000)$ |
|  |  |  |  |  | Less Under | ground Electric: | \$ |  | \$ |  | \$ |  |
|  |  |  |  |  | STBG | Eligible Costs: | \$ | 3,310,213 | \$ | 3,166,278 | \$ | 6,476,491 |
|  |  |  |  |  | aximum STBG | Request (80\%): | \$ | 2,648,170 | \$ | 2,533,022 | \$ | 5,181,193 |
|  |  |  |  |  |  | 20\% Match: | \$ | 662,043 | \$ | 633,256 | \$ | 1,295,298 |

## APPEND|X cost opinion: robins road to council street

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM ROBINS ROAD TO COUNCIL STREET (BRIDGES OVER DRY CREEK AND CNRR) |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Project 5 <br> $\mathbf{0 7 - 1 4 - 1 8}$ <br> cosTs |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ITEMNO. |  | UNIT | HIAWATHA | ROBINS |  | $\frac{\text { QUANTITY }}{\text { TOTAL }}$ | UNIT PRICE |  | HIAWATHA |  | ROBINS |  |  |  |  |  |
|  |  |  |  |  | CEDAR RAPIDS |  |  |  |  |  | CEDAR RAPIDS | TOTAL |  |  |  |
| 1 | CLEAR+GRUBB | LS | 0.6 | 0.3 | 0.1 | 1.0 | \$ | 25,000 | \$ | 15,000 |  |  | \$ | 7,500 | \$ | 2,500 |  | 25,000 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 77709 | 77709 | 38854 | 194272 | \$ | 5 | \$ | 388,545 | \$ | 388,545 | \$ | 194,270 |  | 971,360 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 5200 | 11600 | 5900 | 22700 | \$ | 7 | \$ | 33,800 | \$ | 75,400 | \$ | 38,350 |  | 147,550 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 470 | 760 | 1080 | 2310 | \$ | 3 | \$ | 1,410 | \$ | 2,280 | \$ | 3,240 |  | 6,930 |
| 5 | MODIFIED SUBBASE | CY | 1865 | 1734 | 2375 | 5974 | \$ | 40 | \$ | 74,600 | \$ | 69,360 | \$ | 95,000 |  | 238,960 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 28.9 | 26.88 | 44.76 | 100.54 | \$ | 450 | \$ | 13,005 | \$ | 12,096 | \$ | 20,142 |  | 45,243 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9" | SY | 4700 | 7600 | 10800 | 23100.0 | \$ | 45 | \$ | 211,500 | \$ | 342,000 | \$ | 486,000 |  | 1,039,500 |
| 8 | MEDIAN, PCC, $6^{\prime \prime}$ | SY | 75.0 | 75.0 | 75.0 | 225.0 | \$ | 86 | \$ | 6,450 | \$ | 6,450 | \$ | 6,450 |  | 19,350 |
| 9 | PCC PAV'T SAMPLE | LS | 0.2 | 0.3 | 0.5 | 1.0 | \$ | 3,000 | \$ | 600 | \$ | 900 | \$ | 1,500 |  | 3,000 |
| 10 | HMA (1M ESAL) BASE, 3/4" (8" THICK) | TON | 0.0 | 0.0 | 720.0 | 720.0 | \$ | 62 | \$ |  | \$ | - | \$ | 44,640 |  | 44,640 |
| 11 | HMA (1M ESAL) SURF, 1/2", NO FRIC (2" THICK) | TON | 0.0 | 0.0 | 180.0 | 180.0 | \$ | 58 | \$ | - | \$ | - | \$ | 10,440 |  | 10,440 |
| 12 | ASPH BINDER, PG 58-28 | TON | 0 | 0 | 54 | 54.0 | \$ | 570 | \$ |  | \$ | - | \$ | 30,780 |  | 30,780 |
| 13 | HMA PAV'T SAMPLE | LS | 0.0 | 0.0 | 1.0 | 1.0 | \$ | 4,000 | \$ | - | \$ | - | \$ | 4,000 |  | 4,000 |
| 14 | HMA, DRIVEWAY | SY | 0.0 | 0.0 | 225.0 | 225.0 | \$ | 66 | \$ |  | \$ | - | \$ | 14,850 | \$ | 14,850 |
| 15 | GRANULAR BACKFILL | CY | 2260 | 2170 | 3230 | 7660.0 | \$ | 33 | \$ | 74,580 | \$ | 71,610 | \$ | 106,590 | \$ | 252,780 |
| 16 | APRON, CONC | EACH | 4 | 4 | 4 | 12.0 | \$ | 1,500 | \$ | 6,000 | \$ | 6,000 | \$ | 6,000 | \$ | 18,000 |
| 17 | INTAKE, SW-510 | EACH | 40 | 40 | 50 | 130.0 | \$ | 6,500 | \$ | 260,000 | \$ | 260,000 | \$ | 325,000 |  | 845,000 |
| 18 | SUBDRAIN, LONGITUDINAL, (SHLD) $6^{\prime \prime}$ | LF | 2890 | 2688 | 4476 | 10054.0 | \$ | 11 | \$ | 31,790 | \$ | 29,568 | \$ | 49,236 | \$ | 110,594 |
| 19 | SUBDRAIN OUTLET (RF-19C) | EACH | 40 | 40 | 50 | 130.0 | \$ | 300 | \$ | 12,000 | \$ | 12,000 | \$ | 15,000 | \$ | 39,000 |
| 20 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 2,445 | 2,344 | 3,488 | 8277.0 | \$ | 70 | \$ | 171,150 | \$ | 164,080 | \$ | 244,160 |  | 579,390 |
| 21 | ENGINEER FABRIC | SY | 400 | 400 | 400 | 1200.0 | \$ | 4 | \$ | 1,500 | \$ | 1,500 | \$ | 1,500 | \$ | 4,500 |
| 22 | REVETMENT, CLASS E | TON | 64 | 64 | 64 | 192.0 | \$ | 44 | \$ | 2,816 | \$ | 2,816 | \$ | 2,816 | \$ | 8,448 |
| 23 | RMVL OF PAV'T | SY | 0 | 0 | 2750 | 2750.0 | \$ | 16 | \$ |  | \$ | - | \$ | 44,000 | \$ | 44,000 |
| 24 | RECREATIONAL TRAIL, PCC, 5" | SY | 2110 | 2700 | 3150 | 7960.0 | \$ | 35 | \$ | 73,850 | \$ | 94,500 | S | 110,250 |  | 278,600 |
| 25 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 19 | 24 | 28 | 71.0 | \$ | 440 | \$ | 8,360 | \$ | 10,560 | \$ | 12,320 | \$ | 31,240 |
| 26 | SIDEWALK, PCC, 4" | SY | 0 | 120 | 710 | 830.0 | \$ | 45 | \$ | - | \$ | 5,400 | \$ | 31,950 | \$ | 37,350 |
| 27 | SIDEWALK, PCC, $6^{\prime \prime}$ | SY | 0 | 40 | 50 | 90.0 | \$ | 85 | \$ |  | \$ | 3,400 | \$ | 4,250 |  | 7,650 |
| 28 | DETECTABLE WARNING - CURB RAMP | SF | 0 | 112 | 128 | 240.0 | \$ | 37 | \$ |  | \$ | 4,144 | \$ | 4,736 |  | 8,880 |
| 29 | DRIVEWAY, P.C. CONCRETE, 8 IN | SY | 0 | 0 | 0 | 0.0 | \$ | 65 | \$ | - | \$ | - | \$ | - |  | - |
| 30 | RMVL OF PAVED DRIVEWAY | SY | 0 | 0 | 0 | 0.0 | \$ | 12 | \$ |  | \$ | - | \$ | - | \$ |  |
| 31 | LIGHTING POLES | EACH | 20 | 20 | 20 | 60.0 | \$ | 5,000 | \$ | 100,000 | \$ | 100,000 | \$ | 100,000 | \$ | 300,000 |
| 32 | ELECTRICAL CIRCUIT | LF | 1,445 | 1,344 | 1,298 | 4087.0 | \$ | 13 | \$ | 18,785 | \$ | 17,472 | \$ | 16,874 | \$ | 53,131 |
| 33 | HANDHOLE AND JUNCTION BOX | EACH | 4 | 4 | 4 | 12.0 | \$ | 900 | \$ | 3,600 | \$ | 3,600 | \$ | 3,600 | \$ | 10,800 |
| 34 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 150 | 150 | 200 | 500.0 | \$ | 22 | \$ | 3,300 | \$ | 3,300 | \$ | 4,400 | \$ | 11,000 |
| 35 | TYPE A SIGN, SHEET ALUM | SF | 30 | 30 | 40 | 100.0 | \$ | 22 | \$ | 660 | \$ | 660 | \$ | 880 | \$ | 2,200 |
| 36 | TRAFFIC SIGNALIZATION | EACH | 0 | 0 | 1 | 1.0 | \$ | 300,000 | \$ | - | \$ | - | \$ | 300,000 | \$ | 300,000 |
| 37 | CONSTRUCTION SURVEY | LS | 0.4 | 0.4 | 0.2 | 1.0 | \$ | 50,000 | \$ | 20,000 | \$ | 20,000 | \$ | 10,000 | \$ | 50,000 |
| 38 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 40 | 47 | 77 | 164.0 | \$ | 175 | \$ | 7,000 | \$ | 8,225 | \$ | 13,475 | \$ | 28,700 |
| 39 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 3 | 3 | 12 | 18.0 | \$ | 120 | \$ | 360 | \$ | 360 | \$ | 1,440 | \$ | 2,160 |
| 40 | GROOVE CUT - PAV'T MARK | STA | 40 | 47 | 77 | 164.0 | \$ | 55 | \$ | 2,200 | \$ | 2,585 | \$ | 4,235 | \$ | 9,020 |
| 41 | GROOVE CUT - SYMBOL+LEGEND | EACH | 3 | 3 | 12 | 18.0 | \$ | 115 | \$ | 345 | \$ | 345 | \$ | 1,380 | \$ | 2,070 |
| 42 | TRAFFIC CONTROL | LS | 0.1 | 0.0 | 0.9 | 1.0 | \$ | 250,000 | \$ | 25,000 | \$ | - | \$ | 225,000 | \$ | 250,000 |
| 43 | FLAGGER | EACH | 15 | 0 | 30 | 45.0 | \$ | 425 | \$ | 6,375 | \$ | - | \$ | 12,750 | \$ | 19,125 |
| 44 | MOBILIZATION | LS | 0.4 | 0.4 | 0.2 | 1.0 | \$ | 650,000 | \$ | 260,000 | \$ | 260,000 | \$ | 130,000 | \$ | 750,000 |
| 45 | MODULAR BLOCK RETAIN WALL | SF | 300 | 300 | 300 | 900.0 | \$ | 100 | \$ | 30,000 | \$ | 30,000 | \$ | 30,000 | \$ | 90,000 |
| 46 | TRENCH COMPACTION TESTING | LS | 0.4 | 0.0 | 0.6 | 1.0 | \$ | 8,500 | \$ | 3,400 | \$ | - | \$ | 5,100 | \$ | 8,500 |
| 47 | ADJUST FIRE HYDRANT | EACH | 1 | 0 | 1 | 2.0 | \$ | 3,500 | \$ | 3,500 | \$ | - | \$ | 3,500 | \$ | 7,000 |
| 48 | FIRE HYDRANT ASSEMBLIES | EACH | 2 | 0 | 2 | 4.0 | \$ | 4,800 | \$ | 9,600 | \$ | - | \$ | 9,600 | \$ | 19,200 |
| 49 | GATE VALVE+VALVE BOX, 8" | EACH | 2 | 0 | 2 | 4.0 | \$ | 1,700 | \$ | 3,400 | \$ | - | \$ | 3,400 |  | 6,800 |
| 50 | WATER MAIN, DUCTILE IRON, $8^{\prime \prime}$ | LF | 1,445 | 0 | 1,298 | 2743.0 | \$ | 77 | \$ | 111,265 | \$ | - | \$ | 99,946 |  | 211,211 |

## APPEND|X cost opinion: robins road to council street



## APPENDIX

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROADFROM COUNCIL STREET TO TURTLE RUN |  |  |  |  |  | $\begin{aligned} & \hline \text { Project } 6 \\ & \hline 07-14-18 \\ & \hline \hline \text { costs } \end{aligned}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY |  | PRICE |  |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 3,500 | \$ | 3,500 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 7403 | \$ | 5 | \$ | 37,015 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 4500 | \$ | 7 | \$ | 29,250 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 880 | \$ | 3 | \$ | 2,640 |
| 5 | MODIFIED SUBBASE | CY | 2047 | \$ | 40 | \$ | 81,880 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 33 | \$ | 450 | \$ | 14,850 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9" | SY | 8800 | \$ | 45 | \$ | 396,000 |
| 8 | MEDIAN, PCC, ${ }^{\prime \prime}$ | SY | 225 | \$ | 86 | \$ | 19,350 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | GRANULAR BACKFILL | CY | 2690 | \$ | 33 | \$ | 88,770 |
| 11 | APRON, CONC | EACH | 2 | \$ | 1,500 | \$ | 3,000 |
| 12 | INTAKE, SW-510 | EACH | 50 | \$ | 6,500 | \$ | 325,000 |
| 13 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 3300 | \$ | 11 | \$ | 36,300 |
| 14 | SUBDRAIN OUTLET (RF-19C) | EACH | 50 | \$ | 300 | \$ | 15,000 |
| 15 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 2,900 | \$ | 70 | \$ | 203,000 |
| 16 | ENGINEER FABRIC | SY | 200 | \$ | 4 | \$ | 750 |
| 17 | REVETMENT, CLASS E | TON | 32 | \$ | 44 | \$ | 1,408 |
| 18 | RECREATIONAL TRAIL, PCC, 5" | SY | 3333 | \$ | 35 | \$ | 116,655 |
| 19 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 30 | \$ | 440 | \$ | 13,200 |
| 20 | SIDEWALK, PCC, 4" | SY | 220 | \$ | 45 | \$ | 9,900 |
| 21 | SIDEWALK, PCC, ${ }^{\prime \prime}$ | SY | 45 | \$ | 85 | \$ | 3,825 |
| 22 | DETECTABLE WARNING - CURB RAMP | SF | 128 | \$ | 37 | \$ | 4,736 |
| 23 | LIGHTING POLES | EACH | 20 | \$ | 5,000 | \$ | 100,000 |
| 24 | ELECTRICAL CIRCUIT | LF | 1,650 | \$ | 13 | \$ | 21,450 |
| 25 | HANDHOLE AND JUNCTION BOX | EACH | 4 | \$ | 900 | \$ | 3,600 |
| 26 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 200 | \$ | 22 | \$ | 4,400 |
| 27 | TYPE A SIGN, SHEET ALUM | SF | 40 | \$ | 22 | \$ | 880 |
| 28 | CONSTRUCTION SURVEY | LS | 1 | \$ | 20,000 | \$ | 20,000 |
| 29 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 50 | \$ | 175 | \$ | 8,750 |
| 30 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 8 | \$ | 120 | \$ | 960 |
| 31 | GROOVE CUT - PAV'T MARK | STA | 50 | \$ | 55 | \$ | 2,750 |
| 32 | GROOVE CUT - SYMBOL+LEGEND | EACH | 8 | \$ | 115 | \$ | 920 |
| 33 | TRAFFIC CONTROL | LS | 1 | \$ | 20,000 | \$ | 20,000 |
| 34 | FLAGGER | EACH | 20 | \$ | 425 | \$ | 8,500 |
| 35 | MOBILIZATION | LS | 1 | \$ | 100,000 | \$ | 100,000 |
| 36 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 | \$ | 8,500 |
| 37 | FIRE HYDRANT ASSEMBLIES | EACH | 2 | \$ | 4,800 | \$ | 9,600 |
| 38 | GATE VALVE+VALVE BOX, 8" | EACH | 4 | \$ | 1,700 | \$ | 6,800 |
| 39 | WATER MAIN, DUCTILE IRON, 8" | LF | 2,000 | \$ | 77 | \$ | 154,000 |
| 40 | WATER MAIN FITTING | LB | 6000 | \$ | 10 | \$ | 60,000 |
| 41 | TAPPING SLEEVE+VALVE | EACH | 2 | \$ | 3,250 | \$ | 6,500 |
| 42 | DECORATIVE BRICK PAVERS | SY | 150 | \$ | 125 | \$ | 18,750 |
| 43 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 100 | \$ | 26 | \$ | 2,600 |
| 44 | MOW | ACRE | 12 | \$ | 150 | \$ | 1,800 |
| 45 | MULCH | ACRE | 4 | S | 700 | \$ | 2,800 |
| 46 | SEED+FERTILIZE (URBAN) | ACRE | 4 | \$ | 2,800 | \$ | 11,200 |
| 47 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 4 | \$ | 2,000 | \$ | 8,000 |
| 48 | SILT FENCE | LF | 2475 |  | 3 | \$ | 7,425 |
| 49 | SILT FENCE-DITCH CHECKS | LF | 250 | \$ | 3 | \$ | 625 |
| 50 | SILT BASIN | EACH | 2 | \$ | 400 | \$ | 800 |



## APPENDIX COST OPINION: TURTLE RUN EXTENDED TO SUMMERSET EXTENDED

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM TURTLE RUN EXTENDED TO SUMMERSET EXTENDED |  |  |  |  |  | $\begin{gathered} \hline \hline \text { Project } 7 \\ \hline 07-14-18 \\ \hline \hline \text { CosTs } \end{gathered}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  |  |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 20,000 | \$ | 20,000 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 15312 | \$ | 5 | \$ | 76,560 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 7700 | \$ | 7 | \$ | 50,050 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 1362.3 | \$ | 3 | \$ | 4,087 |
| 5 | MODIFIED SUBBASE | CY | 3525 | \$ | 40 | \$ | 141,000 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 57 | \$ | 450 | \$ | 25,650 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9' | SY | 13623 | \$ | 45 | \$ | 613,035 |
| 8 | MEDIAN, PCC, 6 " | SY | 225 | \$ | 86 | \$ | 19,350 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | GRANULAR BACKFILL | CY | 4490 | \$ | 33 | \$ | 148,170 |
| 11 | APRON, CONC | EACH | 6 | \$ | 1,500 | \$ | 9,000 |
| 12 | INTAKE, SW-510 | EACH | 80 | \$ | 6,500 | \$ | 520,000 |
| 13 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 5700 | \$ | 11 | \$ | 62,700 |
| 14 | SUBDRAIN OUTLET (RF-19C) | EACH | 80 | \$ | 300 | \$ | 24,000 |
| 15 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 4,850 | \$ | 70 | \$ | 339,500 |
| 16 | ENGINEER FABRIC | SY | 600 | \$ | 4 | \$ | 2,250 |
| 17 | REVETMENT, CLASS E | TON | 96 | \$ | 44 | \$ | 4,224 |
| 18 | RECREATIONAL TRAIL, PCC, ${ }^{\prime \prime}$ | SY | 5000 | \$ | 35 | \$ | 175,000 |
| 19 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 45 | \$ | 440 | \$ | 19,800 |
| 20 | SIDEWALK, PCC, 4" | SY | 600 | \$ | 45 | \$ | 27,000 |
| 21 | SIDEWALK, PCC, ${ }^{\prime \prime}$ | SY | 45 | \$ | 85 | \$ | 3,825 |
| 22 | DETECTABLE WARNING - CURB RAMP | SF | 128 | \$ | 37 | \$ | 4,736 |
| 23 | LIGHTING POLES | EACH | 30 | \$ | 5,000 | \$ | 150,000 |
| 24 | ELECTRICAL CIRCUIT | LF | 2,850 | \$ | 13 | \$ | 37,050 |
| 25 | HANDHOLE AND JUNCTION BOX | EACH | 4 | \$ | 900 | \$ | 3,600 |
| 26 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 300 | \$ | 22 | \$ | 6,600 |
| 27 | TYPE A SIGN, SHEET ALUM | SF | 60 | \$ | 22 | \$ | 1,320 |
| 28 | CONSTRUCTION SURVEY | LS | 1 | \$ | 20,000 | \$ | 20,000 |
| 29 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 68 | \$ | 175 | \$ | 11,900 |
| 30 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 14 | \$ | 120 | \$ | 1,680 |
| 31 | GROOVE CUT - PAV'T MARK | STA | 68 | \$ | 55 | \$ | 3,740 |
| 32 | GROOVE CUT - SYMBOL+LEGEND | EACH | 14 | \$ | 115 | \$ | 1,610 |
| 33 | TRAFFIC CONTROL | LS | 1 | \$ | 15,000 | \$ | 15,000 |
| 34 | FLAGGER | EACH | 20 | \$ | 425 | \$ | 8,500 |
| 35 | MOBILIZATION | LS | 1 | \$ | 150,000 | \$ | 150,000 |
| 36 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 |  | 8,500 |
| 37 | FIRE HYDRANT ASSEMBLIES | EACH | 3 | \$ | 4,800 | \$ | 14,400 |
| 38 | GATE VALVE+VALVE BOX, 8" | EACH | 6 | \$ | 1,700 | S | 10,200 |
| 39 | WATER MAIN, DUCTILE IRON, 8" | LF | 2,720 | \$ | 77 | \$ | 209,440 |
| 40 | WATER MAIN FITTING | LB | 8160 | \$ | 10 | \$ | 81,600 |
| 41 | DECORATIVE BRICK PAVERS | SY | 500 | \$ | 125 | \$ | 62,500 |
| 42 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 100 | \$ | 26 | \$ | 2,600 |
| 43 | MOW | ACRE | 18 | \$ | 150 | \$ | 2,700 |
| 44 | MULCH | ACRE | 6 | \$ | 700 | \$ | 4,200 |
| 45 | SEED+FERTILIZE (URBAN) | ACRE | 6 | \$ | 2,800 | \$ | 16,800 |
| 46 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 6 | \$ | 2,000 | \$ | 12,000 |
| 47 | SILT FENCE | LF | 4275 | \$ | 3 | \$ | 12,825 |
| 48 | SILT FENCE-DITCH CHECKS | LF | 430 | \$ | 3 | \$ | 1,075 |
| 49 | SILT BASIN | EACH | 4 | \$ | 400 | \$ | 1,600 |
| 50 | RMVL OF SILT FENCE | LF | 4275 | \$ | 1 | \$ | 4,275 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM TURTLE RUN EXTENDED TO SUMMERSET EXTENDED |  |  |  |  |  | $\overline{\text { Project } 7}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY |  |  |  |  |
| 51 | RMVL OF SILT FENCE-DITCH CHECK | LF | 430 | \$ | 1 | \$ | 430 |
| 52 | CLEAN-OUT OF SILT FENCE | LF | 2137.5 | \$ | 2 | \$ | 3,206 |
| 53 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 215 | \$ | 2 | \$ | 323 |
| 54 | MULCH, SHREDDED BARK | CY | 72 | \$ | 45 | \$ | 3,240 |
| 55 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 216 | \$ | 250 | \$ | 54,000 |


| Sub-Total Construction: | $\$$ | $3,209,850$ |
| ---: | :--- | ---: |
| Incentives: | $\$$ | 42,920 |
| Contingency (15\%): | $\$$ | 481,500 |
| Total Construction: | $\$$ | $3,734,270$ |
| Engineering (15\%): | $\$$ | 560,100 |
| Right-of-way: | $\$$ | 424,898 |
| Underground Electric: | $\$$ | - |
| Construction Admin (9\%): | $\$$ | 336,000 |
| TOTALS: | $\$$ | $5,055,268$ |

FEDERAL AID (OR SWAP) ELIGIBLE COSTS
Total Costs: \$ 5,055,268
Less Utilities: \$ $(324,140)$
Less Engineering/Construction Admin:
Less Underground Electric: STBG Eligible Costs: $\$ 3,835,028$ Maximum STBG Request (80\%) \$ 3,068,022

20\% Match: \$ 767,006

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM SUMMERSET EXTENDED TO C AVENUE |  |  |  |  |  | $\text { Project } 8$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | $07-14-18$ |  |
| $\begin{gathered} \text { ITEM } \\ \text { NO. } \end{gathered}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  | COSTS |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 8,500 | \$ | 8,500 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 43224 | \$ | 5 | \$ | 216,120 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 6700 | \$ | 7 | \$ | 43,550 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 300 | \$ | 3 | \$ | 900 |
| 5 | MODIFIED SUBBASE | CY | 3529 | \$ | 40 | \$ | 141,160 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 75 | \$ | 450 | \$ | 33,750 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9' | SY | 28800 | \$ | 45 | \$ | 1,296,000 |
| 8 | MEDIAN, PCC, 6" | SY | 530 | \$ | 60 | \$ | 31,800 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | HMA (1M ESAL) BASE, 3/4" (8" THICK) | TON | 270 | \$ | 62 | \$ | 16,740 |
| 11 | HMA (1M ESAL) SURF, 1/2", NO FRIC (2" THICK) | TON | 90 | \$ | 58 | \$ | 5,220 |
| 12 | ASPH BINDER, PG 58-28 | TON | 21.6 | \$ | 570 | \$ | 12,312 |
| 13 | HMA PAV'T SAMPLE | LS | 1 | \$ | 4,000 | \$ | 4,000 |
| 14 | HMA, DRIVEWAY | SY | 100 | \$ | 66 | \$ | 6,600 |
| 15 | GRANULAR BACKFILL | CY | 3520 | \$ | 33 | \$ | 116,160 |
| 16 | APRON, CONC | EACH | 2 | \$ | 1,500 | \$ | 3,000 |
| 17 | INTAKE, SW-510 | EACH | 50 | \$ | 4,500 | \$ | 225,000 |
| 18 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 7500 | \$ | 11 | \$ | 82,500 |
| 19 | SUBDRAIN OUTLET (RF-19C) | EACH | 50 | \$ | 300 | \$ | 15,000 |
| 20 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 3,800 | \$ | 70 | \$ | 266,000 |
| 21 | ENGINEER FABRIC | SY | 200 | \$ | 4 | \$ | 750 |
| 22 | REVETMENT, CLASS E | TON | 32 | \$ | 44 | \$ | 1,408 |
| 23 | RMVL OF PAV'T | SY | 7250 | \$ | 16 | \$ | 116,000 |
| 24 | RECREATIONAL TRAIL, PCC, 5" | SY | 3000 | \$ | 35 | \$ | 105,000 |
| 25 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 33 | \$ | 440 | \$ | 14,520 |
| 26 | SIDEWALK, PCC, 4" | SY | 2133 | \$ | 45 | \$ | 95,985 |
| 27 | SIDEWALK, PCC, 6" | SY | 400 | \$ | 85 | \$ | 34,000 |
| 28 | DETECTABLE WARNING - CURB RAMP | SF | 560 | \$ | 37 | \$ | 20,720 |
| 29 | DRIVEWAY, P.C. CONCRETE, 8 IN | SY | 320 | \$ | 65 | \$ | 20,800 |
| 30 | RMVL OF PAVED DRIVEWAY | SY | 120 | \$ | 12 | \$ | 1,440 |
| 31 | LIGHTING POLES | EACH | 20 | \$ | 5,000 | \$ | 100,000 |
| 32 | ELECTRICAL CIRCUIT | LF | 1,350 | \$ | 13 | \$ | 17,550 |
| 33 | HANDHOLE AND JUNCTION BOX | EACH | 4 | \$ | 900 | \$ | 3,600 |
| 34 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 500 | \$ | 22 | \$ | 11,000 |
| 35 | TYPE A SIGN, SHEET ALUM | SF | 100 | \$ | 22 | \$ | 2,200 |
| 36 | RMVL OF TRAFFIC SIGNALIZATION | LS | 1 | \$ | 7,000 | \$ | 7,000 |
| 37 | CONSTRUCTION SURVEY | LS | 1 | \$ | 25,000 | \$ | 25,000 |
| 38 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 150 | \$ | 175 | \$ | 26,250 |
| 39 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 25 | \$ | 120 | \$ | 3,000 |
| 40 | GROOVE CUT - PAV'T MARK | STA | 150 | \$ | 55 | \$ | 8,250 |
| 41 | GROOVE CUT - SYMBOL+LEGEND | EACH | 25 | \$ | 115 | \$ | 2,875 |
| 42 | TRAFFIC CONTROL | LS | 1 | \$ | 50,000 | \$ | 50,000 |
| 43 | FLAGGER | EACH | 60 | \$ | 425 | \$ | 25,500 |
| 44 | MOBILIZATION | LS | 1 | \$ | 150,000 | \$ | 150,000 |
| 45 | MODULAR BLOCK RETAIN WALL | SF | 1000 | \$ | 100 | \$ | 100,000 |
| 46 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 | \$ | 8,500 |
| 47 | ADJUST FIRE HYDRANT | EACH | 2 | \$ | 3,500 | \$ | 7,000 |
| 48 | FIRE HYDRANT ASSEMBLIES | EACH | 6 | \$ | 4,800 | \$ | 28,800 |
| 49 | GATE VALVE+VALVE BOX, 8" | EACH | 6 | \$ | 1,700 | \$ | 10,200 |
| 50 | WATER MAIN, DUCTILE IRON, 8" | LF | 1,500 | \$ | 77 | \$ | 115,500 |



FEDERAL AID (OR SWAP) ELIGIBLE COSTS
Total Costs: \$ 6,193,316
Less Utilities: \$ $(400,000)$

| Less Engineering/Construction Admin: | $\$$ | $(1,146,200)$ |
| ---: | ---: | ---: |
| Less Underground Electric: | $\$$ | $(100,000)$ | ess Underground Electric: STBG Eligible Costs: $\$$ $\frac{(100,000)}{4,547,116}$ Maximum STBG Request (80\%) \$ 3,637,693

20\% Match: \$ 909,423

## APPEND|X cost opinion: c avenue to 900 feet east of meadowknolls road





| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM 900 FEET EAST OF MEADOWKNOLLS ROAD TO 1/4 MILE WEST OF ALBURNETT ROAD |  |  |  |  | $\overline{\text { Project } 10}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  | OSTS |
| 46 | DECORATIVE BRICK PAVERS | SY | 800 | \$ 125 | \$ | 100,000 |
| 47 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 1500 | \$ 26 | \$ | 39,000 |
| 48 | MOW | ACRE | 36 | \$ 150 | \$ | 5,400 |
| 49 | MULCH | ACRE | 12 | \$ 700 | \$ | 8,400 |
| 50 | SEED+FERTILIZE (URBAN) | ACRE | 12 | \$ 2,800 | \$ | 33,600 |
| 51 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 12 | \$ 2,000 | \$ | 24,000 |
| 52 | SILT FENCE | LF | 4881 | \$ 3 | \$ | 14,643 |
| 53 | SILT FENCE-DITCH CHECKS | LF | 490 | \$ 3 | \$ | 1,225 |
| 54 | SILT BASIN | EACH | 8 | \$ 400 | \$ | 3,200 |
| 55 | RMVL OF SILT FENCE | LF | 4881 | \$ 1 | \$ | 4,881 |
| 56 | RMVL OF SILT FENCE-DITCH CHECK | LF | 490 | \$ 1 | \$ | 490 |
| 57 | CLEAN-OUT OF SILT FENCE | LF | 2440.5 | \$ 2 | \$ | 3,661 |
| 58 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 245 | \$ 2 | \$ | 368 |
| 59 | MULCH, SHREDDED BARK | CY | 296 | \$ 45 | \$ | 13,320 |
| 60 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 150 | \$ 50 | \$ | 7,500 |
| 61 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 246 | \$ 250 | \$ | 61,500 |
|  |  |  |  | Sub-Total Construction: \$ 4,318,560 | \$ | 4,318,560 |
|  |  |  |  | Incentives: | \$ | 50,750 |
|  |  |  |  | ontingency (15\%): | \$ | 647,800 |
|  |  |  |  | otal Construction: | \$ | 5,017,110 |
|  |  |  |  | ngineering (15\%): | \$ | 752,600 |
|  |  |  |  | Right-of-way: | \$ | 647,390 |
|  |  |  |  | erground Electric: | \$ | - |
|  |  |  | Constr | ction Admin (9\%): | \$ | 452,000 |
|  |  |  |  | TOTALS: | \$ | 6,869,100 |
| FEDERAL AID (OR SWAP) ELIGIBLE COSTS |  |  |  |  |  |  |
| Total costs: <br> Less Utilities: <br> Less Engineering/Construction Admin: <br> Less Underground Electric: <br> STBG Eligible Costs: |  |  |  |  | \$ | 6,869,100 |
|  |  |  |  |  | \$ | $(393,078)$ |
|  |  |  |  |  | \$ | $(1,204,600)$ |
|  |  |  |  |  | \$ | , |
|  |  |  |  |  | \$ | 5,271,422 |
| Maximum STBG Request (80\%) |  |  |  |  | \$ | 4,217,138 |
| 20\% Match: |  |  |  |  | \$ | 1,054,284 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM 1/4 MILE WEST OF ALBURNETT ROAD |  |  |  |  |  | Project 11 <br> $07-14-18$ <br> COSTS |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  |  |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 10,000 | \$ | 10,000 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 9260 | \$ | 5 | \$ | 46,300 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 3800 | \$ | 7 | \$ | 24,700 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 762.6 | \$ | 3 | \$ | 2,288 |
| 5 | MODIFIED SUBBASE | CY | 1668 | \$ | 40 | \$ | 66,720 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 27 | \$ | 450 | \$ | 12,150 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9" | SY | 7626 | \$ | 45 | \$ | 343,170 |
| 8 | MEDIAN, PCC, 6" | SY | 225 | \$ | 86 | \$ | 19,350 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | GRANULAR BACKFILL | CY | 2150 | \$ | 33 | \$ | 70,950 |
| 11 | APRON, CONC | EACH | 2 | \$ | 1,500 | \$ | 3,000 |
| 12 | INTAKE, SW-510 | EACH | 40 | \$ | 6,500 | \$ | 260,000 |
| 13 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 2646 | \$ | 11 | \$ | 29,106 |
| 14 | SUBDRAIN OUTLET (RF-19C) | EACH | 40 | \$ | 300 | \$ | 12,000 |
| 15 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 2,323 | \$ | 70 | \$ | 162,610 |
| 16 | ENGINEER FABRIC | SY | 200 | \$ | 4 | \$ | 750 |
| 17 | REVETMENT, CLASS E | TON | 32 | \$ | 44 | \$ | 1,408 |
| 18 | RECREATIONAL TRAIL, PCC, 5" | SY | 2780 | \$ | 35 | \$ | 97,300 |
| 19 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 25 | \$ | 440 | \$ | 11,000 |
| 20 | SIDEWALK, PCC, 6" | SY | 28 | \$ | 85 | \$ | 2,380 |
| 21 | DETECTABLE WARNING - CURB RAMP | SF | 80 | \$ | 37 | \$ | 2,960 |
| 22 | LIGHTING POLES | EACH | 20 | \$ | 5,000 | \$ | 100,000 |
| 23 | ELECTRICAL CIRCUIT | LF | 1,323 | \$ | 13 | \$ | 17,199 |
| 24 | HANDHOLE AND JUNCTION BOX | EACH | 2 | \$ | 900 | \$ | 1,800 |
| 25 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 100 | \$ | 22 | \$ | 2,200 |
| 26 | TYPE A SIGN, SHEET ALUM | SF | 20 | \$ | 22 | \$ | 440 |
| 27 | CONSTRUCTION SURVEY | LS | 1 | \$ | 15,000 | \$ | 15,000 |
| 28 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 20 | \$ | 175 | \$ | 3,500 |
| 29 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 6 | \$ | 120 | \$ | 720 |
| 30 | GROOVE CUT - PAV'T MARK | STA | 20 | \$ | 55 | \$ | 1,100 |
| 31 | GROOVE CUT - SYMBOL+LEGEND | EACH | 6 | \$ | 115 | \$ | 690 |
| 32 | TRAFFIC CONTROL | LS | 1 | \$ | 10,000 | \$ | 10,000 |
| 33 | FLAGGER | EACH | 10 | \$ | 425 | \$ | 4,250 |
| 34 | MOBILIZATION | LS | 1 | \$ | 75,000 | \$ | 75,000 |
| 35 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 | \$ | 8,500 |
| 36 | FIRE HYDRANT ASSEMBLIES | EACH | 2 | \$ | 4,800 | \$ | 9,600 |
| 37 | GATE VALVE+VALVE BOX, 8" | EACH | 4 | \$ | 1,700 | \$ | 6,800 |
| 38 | WATER MAIN, DUCTILE IRON, 8" | LF | 1,251 | \$ | 77 | \$ | 96,327 |
| 39 | WATER MAIN FITTING | LB | 3753 | \$ | 10 | \$ | 37,530 |
| 40 | DECORATIVE BRICK PAVERS | SY | 300 | \$ | 125 | \$ | 37,500 |
| 41 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 50 | \$ | 26 | \$ | 1,300 |
| 42 | MOW | ACRE | 9 | \$ | 150 | \$ | 1,350 |
| 43 | MULCH | ACRE | 3 | \$ | 700 | \$ | 2,100 |
| 44 | SEED+FERTILIZE (URBAN) | ACRE | 3 | \$ | 2,800 | \$ | 8,400 |
| 45 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 3 | \$ | 2,000 | \$ | 6,000 |
| 46 | SILT FENCE | LF | 1984.5 | \$ | 3 | \$ | 5,954 |
| 47 | SILT FENCE-DITCH CHECKS | LF | 200 | \$ | 3 | \$ | 500 |
| 48 | SILT BASIN | EACH | 4 | \$ | 400 | \$ | 1,600 |
| 49 | RMVL OF SILT FENCE | LF | 1984.5 | \$ | 1 | \$ | 1,985 |
| 50 | RMVL OF SILT FENCE-DITCH CHECK | LF | 200 | \$ | 1 | \$ | 200 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM1/4 MILE WEST OF ALBURNETT ROAD |  |  |  |  | $\begin{aligned} & \hline \hline \text { Project } 11 \\ & \hline 07-14-18 \end{aligned}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  | OSTS |
| 51 | CLEAN-OUT OF SILT FENCE | LF | 992.25 | \$ 2 | \$ | 1,488 |
| 52 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 100 | \$ 2 | \$ | 150 |
| 53 | MULCH, SHREDDED BARK | CY | 119 | \$ 45 | \$ | 5,355 |
| 54 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 50 | \$ 50 | \$ | 2,500 |
| 55 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 102 | \$ 250 | \$ | 25,500 |
| Sub-Total Construction: \$ 1,673,680 |  |  |  |  |  |  |
| Incentives: \$ 24,030 |  |  |  |  |  |  |
| Contingency (15\%): \$ 251,100 |  |  |  |  |  |  |
| Total Construction: \$ 1,948,810 |  |  |  |  |  |  |
| Engineering (15\%): \$ 292,300 |  |  |  |  |  |  |
| Right-of-way: \$ 242,521 |  |  |  |  |  |  |
| Underground Electric: \$ |  |  |  |  |  |  |
| Construction Admin (9\%): $\$$ |  |  |  |  |  |  |
| TOTALS: \$ 2,658,631 |  |  |  |  |  |  |
| FEDERAL AID (OR SWAP) ELIGIBLE COSTS |  |  |  |  |  |  |
|  |  |  |  | Total costs: | \$ | 2,658,631 |
| Less Utilities: \$ (158,757) |  |  |  |  |  |  |
| Less Engineering/Construction Admin: \$ (467,300) |  |  |  |  |  |  |
| Less Underground Electric: \$ - |  |  |  |  |  |  |
| STBG Eligible Costs: \$ 2,032,574 |  |  |  |  |  |  |
| Maximum STBG Request (80\%) \$ 1,626,060 |  |  |  |  |  |  |
| 20\% Match: \$ 406,515 |  |  |  |  |  |  |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM RELOCATED WINSLOW TO EXISTING WINSLOW (BRIDGE OVER INDIAN CREEK) |  |  |  |  |  | $\overline{~ P r o j e c t ~} 12$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY |  | NIT PRICE |  | costs |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 20,000.00 | \$ | 20,000.00 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 33618 | \$ | 5.00 | \$ | 168,090.00 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 6744 | \$ | 6.50 | \$ | 43,836.00 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 1565.5 | \$ | 3.00 | \$ | 4,696.50 |
| 5 | MODIFIED SUBBASE | CY | 19569 | \$ | 40.00 | \$ | 782,760.00 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 64 | \$ | 450.00 | \$ | 28,800.00 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9' | SY | 15655 | \$ | 45.00 | \$ | 704,475.00 |
| 8 | MEDIAN, PCC, 6" | SY | 225 | \$ | 86.00 | \$ | 19,350.00 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000.00 | \$ | 3,000.00 |
| 10 | HMA (1M ESAL) BASE, 3/4" (8" THICK) | TON | 335 | \$ | 62.00 | \$ | 20,770.00 |
| 11 | HMA (1M ESAL) SURF, 1/2", NO FRIC (2" THICK) | TON | 84 | \$ | 58.00 | \$ | 4,872.00 |
| 12 | ASPH BINDER, PG 58-28 | TON | 25 | \$ | 570.00 | \$ | 14,250.00 |
| 13 | HMA PAV'T SAMPLE | LS | 1 | \$ | 4,000.00 | \$ | 4,000.00 |
| 14 | HMA, DRIVEWAY | SY | 70 | \$ | 66.00 | \$ | 4,620.00 |
| 15 | GRANULAR BACKFILL | CY | 4560 | \$ | 33.00 | \$ | 150,480.00 |
| 16 | APRON, CONC | EACH | 6 | \$ | 1,500.00 | \$ | 9,000.00 |
| 17 | INTAKE, SW-510 | EACH | 70 | \$ | 6,500.00 | \$ | 455,000.00 |
| 18 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 6350 | \$ | 11.00 | \$ | 69,850.00 |
| 19 | SUBDRAIN OUTLET (RF-19C) | EACH | 70 | \$ | 300.00 | \$ | 21,000.00 |
| 20 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 4,925 | \$ | 70.00 | \$ | 344,750.00 |
| 21 | ENGINEER FABRIC | SY | 600 | \$ | 3.75 | \$ | 2,250.00 |
| 22 | REVETMENT, CLASS E | TON | 1000 | S | 44.00 | \$ | 44,000.00 |
| 23 | RMVL OF PAV'T | SY | 5500 | \$ | 10.00 | \$ | 55,000.00 |
| 24 | RECREATIONAL TRAIL, PCC, 5" | SY | 6222 | \$ | 35.00 | \$ | 217,770.00 |
| 25 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 56 | \$ | 440.00 | \$ | 24,640.00 |
| 26 | SIDEWALK, PCC, 4" | SY | 100 | \$ | 45.00 | \$ | 4,500.00 |
| 27 | SIDEWALK, PCC, ${ }^{\prime \prime}$ | SY | 15 | \$ | 85.00 | \$ | 1,275.00 |
| 28 | DETECTABLE WARNING - CURB RAMP | SF | 40 | \$ | 37.00 | \$ | 1,480.00 |
| 29 | RMVL OF PAVED DRIVEWAY | SY | 40 | \$ | 12.00 | \$ | 480.00 |
| 30 | LIGHTING POLES | EACH | 30 | \$ | 5,000.00 | \$ | 150,000.00 |
| 31 | ELECTRICAL CIRCUIT | LF | 3,175 | \$ | 13.00 | \$ | 41,275.00 |
| 32 | HANDHOLE AND JUNCTION BOX | EACH | 5 | \$ | 900.00 | \$ | 4,500.00 |
| 33 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 200 | \$ | 22.00 | \$ | 4,400.00 |
| 34 | TYPE A SIGN, SHEET ALUM | SF | 40 | \$ | 22.00 | \$ | 880.00 |
| 35 | CONSTRUCTION SURVEY | LS | 1 | \$ | 50,000.00 | \$ | 50,000.00 |
| 36 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 96 | \$ | 175.00 | \$ | 16,800.00 |
| 37 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 9 | \$ | 120.00 | \$ | 1,080.00 |
| 38 | GROOVE CUT - PAV'T MARK | STA | 96 | \$ | 55.00 | \$ | 5,280.00 |
| 39 | GROOVE CUT - SYMBOL+LEGEND | EACH | 9 | \$ | 115.00 | \$ | 1,035.00 |
| 40 | TRAFFIC CONTROL | LS | 1 | \$ | 30,000.00 | \$ | 30,000.00 |
| 41 | FLAGGER | EACH | 40 | \$ | 425.00 | \$ | 17,000.00 |
| 42 | MOBILIZATION | LS | 1 | \$ | 350,000.00 | \$ | 350,000.00 |
| 43 | MODULAR BLOCK RETAIN WALL | SF | 1000 | \$ | 100.00 | \$ | 100,000.00 |
| 44 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500.00 | \$ | 8,500.00 |
| 45 | ADJUST FIRE HYDRANT | EACH | 2 | \$ | 3,500.00 | \$ | 7,000.00 |
| 46 | FIRE HYDRANT ASSEMBLIES | EACH | 1 | \$ | 4,800.00 | \$ | 4,800.00 |
| 47 | PRECAST PRESTRESS BRIDGE OVER INDIAN CREEK | LS | 1 | \$ | 4,300,000.00 | \$ | 4,300,000.00 |
| 48 | DECORATIVE BRICK PAVERS | SY | 500 | \$ | 125.00 | \$ | 62,500.00 |
| 49 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 500 | \$ | 26.00 | \$ | 13,000.00 |
| 50 | MOW | ACRE | 18 | \$ | 150.00 | \$ | 2,700.00 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM RELOCATED WINSLOW TO EXISTING WINSLOW (BRIDGE OVER INDIAN CREEK) |  |  |  |  |  | Project 12 <br> $\mathbf{0 7 - 1 4 - 2 1}$ <br> COSTS |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY |  | PRICE |  |  |
| 51 | MULCH | ACRE | 6 | \$ | 700.00 | \$ | 4,200.00 |
| 52 | SEED+FERTILIZE (URBAN) | ACRE | 6 | \$ | 2,800.00 | \$ | 16,800.00 |
| 53 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 6 | \$ | 2,000.00 | \$ | 12,000.00 |
| 54 | SILT FENCE | LF | 4762.5 | \$ | 3.00 | \$ | 14,287.50 |
| 55 | SILT FENCE-DITCH CHECKS | LF | 480 | \$ | 2.50 | \$ | 1,200.00 |
| 56 | SILT BASIN | EACH | 4 | \$ | 400.00 | \$ | 1,600.00 |
| 57 | RMVL OF SILT FENCE | LF | 4762.5 | \$ | 1.00 | \$ | 4,762.50 |
| 58 | RMVL OF SILT FENCE-DITCH CHECK | LF | 480 | \$ | 1.00 | \$ | 480.00 |
| 59 | CLEAN-OUT OF SILT FENCE | LF | 2381.25 | \$ | 1.50 | \$ | 3,571.88 |
| 60 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 240 | \$ | 1.50 | \$ | 360.00 |
| 61 | MULCH, SHREDDED BARK | CY | 340 | \$ | 45.00 | \$ | 15,300.00 |
| 62 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 300 | \$ | 50.00 | \$ | 15,000.00 |
| 63 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 240 | \$ | 250.00 | \$ | 60,000.00 |


| Sub-Total Construction: | $\$$ | $8,545,310$ |
| ---: | :--- | ---: |
| Incentives: | $\$$ | 52,110 |
| Contingency (15\%): | $\$$ | $1,281,800$ |
| Construction: | $\$$ | $9,879,220$ |
| Engineering (15\%): | $\$$ | $1,481,900$ |
| Right-of-way: | $\$$ | 6,265 |
| Underground Electric: | $\$$ | - |
| Construction Admin (9\%): | $\$$ | 889,000 |
| TOTALS: | $\$$ | $12,256,385$ |

## FEDERAL AID (OR SWAP) ELIGIBLE COSTS

Total costs: \$ 12,256,385
Less Utilities: \$ $(20,300)$
Less Construction Admin:
Less Underground Electric:
STBG Eligible Costs:
$(889,000)$

Maximum STBG Request (80\%) \$ 9,077,668
20\% Match: $\$ 2,269,417$

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM THE RIDGE AT INDIAN CREEK TO ONE MILE WEST OF IA HIGHWAY 13 |  |  |  |  |  | Project 13 <br> 07-14-18 <br> CosTs |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY |  | PRICE |  |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 3,500 | \$ | 3,500 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 16590 | \$ | 5 | \$ | 82,950 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 9300 | \$ | 7 | \$ | 60,450 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 1946 | \$ | 3 | \$ | 5,838 |
| 5 | MODIFIED SUBBASE | CY | 3596 | \$ | 40 | \$ | 143,840 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 57 | \$ | 450 | \$ | 25,650 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9' | SY | 19460 | \$ | 45 | \$ | 875,700 |
| 8 | MEDIAN, PCC, 6 " | SY | 400 | \$ | 86 | \$ | 34,400 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | GRANULAR BACKFILL | CY | 4490 | \$ | 33 | \$ | 148,170 |
| 11 | APRON, CONC | EACH | 4 | \$ | 1,500 | \$ | 6,000 |
| 12 | INTAKE, SW-510 | EACH | 80 | \$ | 6,500 | \$ | 520,000 |
| 13 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 5700 | \$ | 11 | \$ | 62,700 |
| 14 | SUBDRAIN OUTLET (RF-19C) | EACH | 80 | \$ | 300 | \$ | 24,000 |
| 15 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 4,850 | \$ | 70 | \$ | 339,500 |
| 16 | ENGINEER FABRIC | SY | 400 | \$ | 4 | \$ | 1,500 |
| 17 | REVETMENT, CLASS E | TON | 64 | \$ | 44 | \$ | 2,816 |
| 18 | RECREATIONAL TRAIL, PCC, 5" | SY | 6000 | \$ | 35 | \$ | 210,000 |
| 19 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 54 | \$ | 440 | \$ | 23,760 |
| 20 | SIDEWALK, PCC, 4" | SY | 630 | \$ | 45 | \$ | 28,350 |
| 21 | SIDEWALK, PCC, 6" | SY | 200 | \$ | 85 | \$ | 17,000 |
| 22 | DETECTABLE WARNING - CURB RAMP | SF | 416 | \$ | 37 | \$ | 15,392 |
| 23 | LIGHTING POLES | EACH | 30 | \$ | 5,000 | \$ | 150,000 |
| 24 | ELECTRICAL CIRCUIT | LF | 2,850 | \$ | 13 | \$ | 37,050 |
| 25 | HANDHOLE AND JUNCTION BOX | EACH | 4 | \$ | 900 | \$ | 3,600 |
| 26 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 300 | \$ | 22 | \$ | 6,600 |
| 27 | TYPE A SIGN, SHEET ALUM | SF | 60 | \$ | 22 | \$ | 1,320 |
| 28 | CONSTRUCTION SURVEY | LS | 1 |  | 20,000 | \$ | 20,000 |
| 29 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 74 | \$ | 175 | \$ | 12,950 |
| 30 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 11 | \$ | 120 | \$ | 1,320 |
| 31 | GROOVE CUT - PAV'T MARK | STA | 74 | \$ | 55 | \$ | 4,070 |
| 32 | GROOVE CUT - SYMBOL+LEGEND | EACH | 11 | \$ | 115 | \$ | 1,265 |
| 33 | TRAFFIC CONTROL | LS | 1 | \$ | 10,000 | \$ | 10,000 |
| 34 | FLAGGER | EACH | 10 | \$ | 425 | \$ | 4,250 |
| 35 | MOBILIZATION | LS | 1 | \$ | 100,000 | \$ | 100,000 |
| 36 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 | \$ | 8,500 |
| 37 | FIRE HYDRANT ASSEMBLIES | EACH | 4 | \$ | 4,800 | \$ | 19,200 |
| 38 | GATE VALVE+VALVE BOX, 8" | EACH | 5 | \$ | 1,700 | \$ | 8,500 |
| 39 | WATER MAIN, DUCTILE IRON, 8" | LF | 2,700 | \$ | 77 | \$ | 207,900 |
| 40 | WATER MAIN FITTING | LB | 8100 | \$ | 10 | \$ | 81,000 |
| 41 | DECORATIVE BRICK PAVERS | SY | 300 | \$ | 125 | \$ | 37,500 |
| 42 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 100 | \$ | 26 | \$ | 2,600 |
| 43 | MOW | ACRE | 18 | \$ | 150 | \$ | 2,700 |
| 44 | MULCH | ACRE | 6 | \$ | 700 | \$ | 4,200 |
| 45 | SEED+FERTILIZE (URBAN) | ACRE | 6 | \$ | 2,800 | \$ | 16,800 |
| 46 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 6 | \$ | 2,000 | \$ | 12,000 |
| 47 | SILT FENCE | LF | 4275 | \$ | 3 | \$ | 12,825 |
| 48 | SILT FENCE-DITCH CHECKS | LF | 430 | \$ | 3 | \$ | 1,075 |
| 49 | SILT BASIN | EACH | 4 | \$ | 400 | \$ | 1,600 |
| 50 | RMVL OF SILT FENCE | LF | 4275 | \$ | 1 | \$ | 4,275 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM THE RIDGE AT INDIAN CREEK TO ONE MILE WEST OF IA HIGHWAY 13 |  |  |  |  | Project 13 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  | OSTS |
| 51 | RMVL OF SILT FENCE-DITCH CHECK | LF | 430 | \$ 1 | \$ | 430 |
| 52 | CLEAN-OUT OF SILT FENCE | LF | 2137.5 | \$ 2 | \$ | 3,206 |
| 53 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 215 | \$ 2 | \$ | 323 |
| 54 | MULCH, SHREDDED BARK | CY | 223 | \$ 45 | \$ | 10,035 |
| 55 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 20 | \$ 50 | \$ | 1,000 |
| 56 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 216 | \$ 250 | \$ | 54,000 |
| Sub-Total Construction: \$ 3,476,610 |  |  |  |  |  |  |
| Incentives: \$ 61,300 |  |  |  |  |  |  |
| Contingency (15\%): \$ 521,500 |  |  |  |  |  |  |
| Total Construction: \$ 4,059,410 |  |  |  |  |  |  |
| Engineering (15\%): \$ 608,900 |  |  |  |  |  |  |
| Right-of-way: \$ 506,565 |  |  |  |  |  |  |
|  |  |  |  | derground Electric: | \$ | - |
| Construction Admin (9\%): \$ 365,000 |  |  |  |  |  |  |
| TOTALS: \$ 5,539,875 |  |  |  |  |  |  |
| FEDERAL AID (OR SWAP) ELIGIBLE COSTS |  |  |  |  |  |  |
| Total costs: \$ 5,539,875 |  |  |  |  |  |  |
| Less Utilities: \$ (325,100) |  |  |  |  |  |  |
| Less Construction Admin: \$ (365,000) |  |  |  |  |  |  |
| Less Underground Electric: |  |  |  |  |  |  |
| STBG Eligible Costs: \$ 4,849,775 |  |  |  |  |  |  |
| Maximum STBG Request (80\%) \$ 3,879,820 |  |  |  |  |  |  |
|  |  |  |  | 20\% Match: | \$ | 969,955 |

## APPENDIX <br> COST OPINION: ONE MILE WEST OF IA HIGHWAY 13 TO IA HIGHWAY 13

| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROMONE MILE WEST OF IA HIGHWAY 13 TO IA HIGHWAY 13 |  |  |  |  |  | Project 14 <br> $07-14-18$ <br> COSTS |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \hline \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  |  |  |
| 1 | CLEAR+GRUBB | LS | 1 | \$ | 3,500 | \$ | 3,500 |
| 2 | EXCAVATION, CL 10, RDWY+BORROW | CY | 18307 | \$ | 5 | \$ | 91,535 |
| 3 | TOPSOIL, STRIP, SALVAGE+SPREAD | CY | 7500 | \$ | 7 | \$ | 48,750 |
| 4 | SUBGRADE STABIL MAT'L, POLYMER GRID | SY | 1653.4 | \$ | 3 | \$ | 4,960 |
| 5 | MODIFIED SUBBASE | CY | 3265 | \$ | 40 | \$ | 130,600 |
| 6 | SHLD CONSTRUCTION, EARTH | STA | 53 | \$ | 450 | \$ | 23,850 |
| 7 | STD/S-F PCC PAV'T, CL C CL 2, 9" | SY | 16534 | \$ | 45 | \$ | 744,030 |
| 8 | MEDIAN, PCC, 6" | SY | 150 | \$ | 86 | \$ | 12,900 |
| 9 | PCC PAV'T SAMPLE | LS | 1 | \$ | 3,000 | \$ | 3,000 |
| 10 | GRANULAR SHOULDERS, TYPE A | TON | 135 | \$ | 30 | \$ | 4,050 |
| 11 | GRANULAR BACKFILL | CY | 4040 | \$ | 33 | \$ | 133,320 |
| 12 | APRON, CONC | EACH | 8 | \$ | 1,500 | \$ | 12,000 |
| 13 | INTAKE, SW-510 | EACH | 70 | \$ | 6,500 | \$ | 455,000 |
| 14 | SUBDRAIN, LONGITUDINAL, (SHLD) 6" | LF | 5230 | \$ | 11 | \$ | 57,530 |
| 15 | SUBDRAIN OUTLET (RF-19C) | EACH | 70 | \$ | 300 | \$ | 21,000 |
| 16 | STORM SWR G-MAIN,TRENCHED, RCP 2000D | LF | 4,365 | \$ | 70 | \$ | 305,550 |
| 17 | ENGINEER FABRIC | SY | 800 | \$ | 4 | \$ | 3,000 |
| 18 | REVETMENT, CLASS E | TON | 128 | \$ | 44 | \$ | 5,632 |
| 19 | RMVL OF PAV'T | SY | 250 | \$ | 16 | \$ | 4,000 |
| 20 | RECREATIONAL TRAIL, PCC, ${ }^{\prime \prime}$ | SY | 5367 | \$ | 35 | \$ | 187,845 |
| 21 | SPECIAL COMPACTION OF SUBGRADE/REC TRAIL | STA | 48 | \$ | 440 | \$ | 21,120 |
| 22 | SIDEWALK, PCC, ${ }^{\prime \prime}$ | SY | 160 | \$ | 45 | \$ | 7,200 |
| 23 | SIDEWALK, PCC, ${ }^{\prime \prime}$ | SY | 60 | \$ | 85 | \$ | 5,100 |
| 24 | DETECTABLE WARNING - CURB RAMP | SF | 168 | \$ | 37 | \$ | 6,216 |
| 25 | LIGHTING POLES | EACH | 30 | \$ | 5,000 | \$ | 150,000 |
| 26 | ELECTRICAL CIRCUIT | LF | 2,615 | \$ | 13 | \$ | 33,995 |
| 27 | HANDHOLE AND JUNCTION BOX | EACH | 6 | \$ | 900 | \$ | 5,400 |
| 28 | WOOD POST-TYPE A/B SIGN, 4"X4" | LF | 400 | \$ | 22 | \$ | 8,800 |
| 29 | TYPE A SIGN, SHEET ALUM | SF | 80 | \$ | 22 | \$ | 1,760 |
| 30 | TRAFFIC SIGNALIZATION | EACH | 1 | \$ | 300,000 | \$ | 300,000 |
| 31 | CONSTRUCTION SURVEY | LS | 1 | \$ | 30,000 | \$ | 30,000 |
| 32 | PAINTED PAV'T MARK, HIGHBUILD WATERBORNE | STA | 87 | \$ | 175 | \$ | 15,225 |
| 33 | PAINTED SYMBOL+LEGEND,HIBUILD WATERBORNE | EACH | 20 | \$ | 120 | \$ | 2,400 |
| 34 | GROOVE CUT - PAV'T MARK | STA | 87 | \$ | 55 | \$ | 4,785 |
| 35 | GROOVE CUT - SYMBOL+LEGEND | EACH | 20 | \$ | 115 | \$ | 2,300 |
| 36 | TRAFFIC CONTROL | LS | 1 | \$ | 70,000 | \$ | 70,000 |
| 37 | FLAGGER | EACH | 30 | \$ | 425 | \$ | 12,750 |
| 38 | MOBILIZATION | LS | 1 | \$ | 150,000 | \$ | 150,000 |
| 39 | TRENCH COMPACTION TESTING | LS | 1 | \$ | 8,500 | \$ | 8,500 |
| 40 | FIRE HYDRANT ASSEMBLIES | EACH | 4 | \$ | 4,800 | \$ | 19,200 |
| 41 | GATE VALVE+VALVE BOX, 8" | EACH | 4 | \$ | 1,700 | \$ | 6,800 |
| 42 | WATER MAIN, DUCTILE IRON, 8" | LF | 2,415 | \$ | 77 | \$ | 185,955 |
| 43 | WATER MAIN FITTING | LB | 7245 | \$ | 10 | \$ | 72,450 |
| 44 | TAPPING SLEEVE+VALVE | EACH | 1 | \$ | 3,250 | \$ | 3,250 |
| 45 | DECORATIVE BRICK PAVERS | SY | 300 | \$ | 125 | \$ | 37,500 |
| 46 | SLOPE PROTECTION, WOOD EXCELSIOR | SQ | 150 | \$ | 26 | \$ | 3,900 |
| 47 | MOW | ACRE | 18 | \$ | 150 | \$ | 2,700 |
| 48 | MULCH | ACRE | 6 | \$ | 700 | \$ | 4,200 |
| 49 | SEED+FERTILIZE (URBAN) | ACRE | 6 | \$ | 2,800 | \$ | 16,800 |
| 50 | STABILIZE CROP - SEED+FERTILIZE | ACRE | 6 | \$ | 2,000 | \$ | 12,000 |


| ESTIMATED PROJECT QUANTITIES - TOWER TERRACE ROAD FROM ONE MILE WEST OF IA HIGHWAY 13 TO IA HIGHWAY 13 |  |  |  |  | Project 14 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { ITEM } \\ & \text { NO. } \end{aligned}$ | ITEM | UNIT | QUANTITY | UNIT PRICE |  | OSTS |
| 51 | SILT FENCE | LF | 3922.5 | \$ 3 | \$ | 11,768 |
| 52 | SILT FENCE-DITCH CHECKS | LF | 390 | \$ 3 | \$ | 975 |
| 53 | SILT BASIN | EACH | 4 | \$ 400 | \$ | 1,600 |
| 54 | RMVL OF SILT FENCE | LF | 3922.5 | \$ 1 | \$ | 3,923 |
| 55 | RMVL OF SILT FENCE-DITCH CHECK | LF | 390 | \$ 1 | \$ | 390 |
| 56 | CLEAN-OUT OF SILT FENCE | LF | 1961.25 | \$ 2 | \$ | 2,942 |
| 57 | CLEAN-OUT OF SILT FENCE-DITCH CHECK | LF | 195 | \$ 2 | \$ | 293 |
| 58 | MULCH, SHREDDED BARK | CY | 205 | \$ 45 | \$ | 9,225 |
| 59 | SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 20 | \$ 50 | \$ | 1,000 |
| 60 | TREES, FURNISHED AND INSTALLED (WITH WARRANTY) | EACH | 198 | \$ 250 | \$ | 49,500 |
| Sub-Total Construction: \$ 3,533,970 |  |  |  |  |  |  |
| Incentives: \$ 52,090 |  |  |  |  |  |  |
| Contingency (15\%): \$ 530,100 |  |  |  |  |  |  |
| Total Construction: \$ 4,116,160 |  |  |  |  |  |  |
| Engineering (15\%): \$ 617,400 |  |  |  |  |  |  |
| Right-of-way: \$ 387,016 |  |  |  |  |  |  |
| Underground Electric: |  |  |  |  |  |  |
| Construction Admin (9\%): \$ 370,000 |  |  |  |  |  |  |
| TOTALS: \$ 5,490,576 |  |  |  |  |  |  |
| FEDERAL AID (OR SWAP) ELIGIBLE COSTS |  |  |  |  |  |  |
| Total costs: \$ 5,490,576 |  |  |  |  |  |  |
| Less Utilities: \$ (296,155) |  |  |  |  |  |  |
| Less Construction Admin: \$ (370,000) |  |  |  |  |  |  |
| Less Underground Electric: \$ |  |  |  |  |  |  |
| STBG Eligible Costs: \$ 4,824,421 |  |  |  |  |  |  |
| Maximum STBG Request (80\%) \$ 3,859,537 |  |  |  |  |  |  |
| 20\% Match: \$ 964,884 |  |  |  |  |  |  |

## DURABLE PAVEMENT MARKINGS

Pavement markings provide traffic control and guidance for road users (drivers, bicyclists, pedestrians) and include lines, symbols, and words to convey the intended use of the pavement area. Most pavement markings are reflective for visibility during the day, night, and under raining conditions. Once pavement markings are installed on a roadway, the responsible jurisdiction (state, city, or county) must maintain the markings so they are effective in controlling traffic. Over time, all pavement markings fade or are worn off by traffic, or lose their reflectivity and are not effective at night or under adverse weather. To reapply pavement markings not only has a labor and material cost, but also a safety cost to striping crews and the general public as workers must be present in traffic to reapply the markings.

The following costs and lifespan information are taken from work by the University of Illinois, in conjunction with the Illinois Department of Transportation in their report "Pavement Marking Selection, Installation and Inspection Manual", August, 2015.

Simple pavement marking materials like waterborne paints are low cost, at around $\$ 0.10$ per foot of 4 -inch wide marking (an industry standard minimum width). But under high traffic (more than 7,000 vehicles per day) tend to wear off frequently and may only last 1 to 2 years. Most waterborne paints are not considered durable pavement markings. Transverse pavement markings such as stop bars and cross walk markings which are subject to a lot of wheel traffic can wear off in as little as 6 months. Longitudinal markings (edge lines and so forth) usually last closer to the 2 -year point as they are not being driven on directly day in and day out. While waterborne paints provide longer, satisfactory life on low volume roads, durable pavement markings are normally installed on higher volume roads.

Durable pavement markings are markings intended to last several years without reapplication under high traffic exposure. These include Epoxy based paints, Polyurea and Urethane based paints, hot applied thermoplastic, and preformed cold plastic markings. On Hot Mix Asphalt (HMA) pavement, preformed plastic pavement markings are rolled into the hot asphalt as it is constructed and are very durable (lasting 7 to 9 years before needing reapplication). Thermoplastics and the other listed pains generally have similar life spans of around 5 to 9 years. Durable pavement markings tend to bond very tightly to HMA pavement surfaces and withstand abrasive environments from snowplows and salt/sand action under tires. Durable pavement markings for HMA typically cost between $\$ 0.22$ per foot up to $\$ 0.97$ per foot.

Concrete pavements tend not to bond as well with any pavement markings, compared to HMA. Even the durable marking materials listed previously tend to become rigid at cold temperatures and pop off of the concrete surface especially under snowplow blades. To prevent the markings from separating from the pavement under snowplowing, grooves are ground into the concrete pavement surface at the pavement marking locations so the surface of the pavement markings sit at, or just slightly below the surface of the pavement. Durable pavement markings for concrete pavement cost between $\$ 0.26$ per foot up to $\$ 0.56$ per foot.

Comparing durable pavement marking costs to non-durable marking costs, the durable markings can cost anywhere from two to ten times as much as non-durable markings. On average, durable markings usually run about five times the cost of non-durable markings. However, the lifespan of durable pavement markings generally range between five and ten times the life of non-durable markings. Therefore, while the initial cost of the pavement markings are higher for durable materials, the lifespan and much lower frequency of pavement marking maintenance more than make up the difference in cost.

EARTHWORK COST ESTIMATE BY PROJECT PHASE

| PROJECT PHASE | PROJECT PHASE LIMITS | NET <br> EARTHWORK (CUBIC YARDS) | $\begin{aligned} & \hline \text { TOTAL } \\ & \text { CUT } \\ & \text { (CUBIC } \\ & \text { YARDS) } \\ & \hline \end{aligned}$ | TOTAL <br> FILL (CUBIC YARDS) |
| :---: | :---: | :---: | :---: | :---: |
| 1 | Edgewood Road to W. Edge of I-380 Interchange | 9,316 | 13,105 | 3,789 |
| - | I-380 Interchange (By lowa DOT) | - | - | - |
| 2 | E. Edge of I-380 Interchange to Center Point Road | 9,940 | 10,321 | 381 |
| 3 | Center Point Road to Stamy Road | $(3,642)$ | 5,962 | 9,604 |
| 4 | Stamy Road to Robins Road | $(3,246)$ | 4,199 | 7,444 |
| 5 | Robins Road to Council Street (Bridges Over Dry Creek and Canadian National Railway) | $(176,356)$ | 17,916 | 194,272 |
| 6 | Council Street to Turtle Run Extended | 2,684 | 7,403 | 4,719 |
| 7 | Turtle Run Extended to Summerset Extended | 3,555 | 15,312 | 11,758 |
| 8 | Summerset Extended to C Avenue | 29,959 | 43,224 | 13,264 |
| 9 | C Avenue to 900 Feet East of Meadowknolls Road | 69,297 | 77,943 | 8,645 |
| 10 | 900 Feet East of Meadowknolls Road to 1/4 Mile West of Alburnett Road | $(43,798)$ | 5,211 | 49,009 |
| 11 | 1/4 Mile West of Alburnett Road | 6,380 | 9,260 | 2,880 |
| - | Alburnett Road to Relocated Winslow (Already Built) | - | - | - |
| 12 | Relocated Winslow to Existing Winslow (Bridge Over Indian Creek) | $(25,767)$ | 7,851 | 33,618 |
| - | Existing Winslow Road to E. Edge of Abode Development/The Ridge at Indian Creek (Already Built or Designed/Under Construction) | - | - | - |
| 13 | The Ridge at Indian Creek to One Mile West of Highway 13 | 9,049 | 16,590 | 7,541 |
| 14 | One Mile West of IA Highway 13 to IA Highway 13 | $(3,993)$ | 14,314 | 18,307 |

## Tower Terrace Road Corridor Management Plan Update - Comments

Open House Attendance: Approx. 300 (234 signed in - included couples/some didn't sign in)

Open House Comments: 51 (12 with follow up needed)
Other Comments: 5 ( 2 with follow up needed)
Total Comments: 56

| Comment Summary | Number |
| :--- | :---: |
| In favor of pedestrian underpass at I-380 | 41 |
| In favor of pedestrian underpass at CVNT | 19 |
| Build Tower Terrace Road as four lane now | 5 |
| Keep bike lanes on Tower Terrace Road under 4 lane scenario | 4 |
| Accelerate the schedule to complete Tower Terrace Road | 4 |
| Concern about noise pollution | 3 |
| Prefer a mixture of median plantings: some pollinator, some bluegrass, some landscape | 2 |
| In favor of pollinator habitat | 3 |
| Add better lighting at CVNT Crossing | 1 |
| In favor of at-grade crossing at CVNT with automated flashing lights | 1 |
| Concern about staged construction resulting in short-term neighborhood cut through traffic | 1 |
| Use colored concrete for the bicycle lanes | 1 |
| Prefer 50\% timeline | 1 |
| Not in favor of bike lanes at all | 1 |
| At-grade RR Xing causes trains to blow horn in residential area | 1 |
| Interchange appears overbuilt | 1 |
| Leave space for artwork/entry monuments particularly at the interchange | 1 |
| Prefer roundabout intersection treatments | 1 |
| Trailer park not addressed/Concern about relocations | 2 |
| Drainage concerns near C Avenue and E. Main Street | 1 |
| Wondering about speed limit | 1 |
| Wondering about the kind of retail | 1 |
| St. Mark's Church enter/exit concerns | 1 |
| Cost difference of 22' vs. 20' lanes/begin with 22' lanes? | 1 |

## Preference Boards

Median Treatments
Grass: 19
Native/Pollinator: 81
Mix: 13

## I-380 Crossing

At-grade: 7
Underpass: 120

Cedar Valley Nature Trail Crossing
At-grade: 6
Underpass: 117

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## Memorandum

Date: Friday, January 04, 2019

Project: Tower Terrace Road Corridor Management Plan Update

To: Corridor MPO

From: Brian Goss and Laura Lutz-Zimmerman

Subject: Environmental Review

## METHODOLOGY

HDR reviewed the corridor identified in the Tower Terrace Road Corridor Management Plan from just west of I-380 east to lowa Highway 13. The Plan subdivided the corridor into seven segments, which may or may not represent logical termini of independent utility (whereby a segment could be constructed and function as a transportation improvement independently, whether or not other segments were constructed). Roadway construction has occurred on some of the segments identified in the Plan and design is occurring for segments or portions of other segments. The Federal Highway Administration (FHWA) would provide input on whether unconstructed segments seeking federal funds for construction would have logical termini and independent utility; however this would not be required for locally funded segments

HDR gathered environmental and other related geographic information system (GIS) data from shapefiles available from Linn County and Cedar Rapids, as well as lowa Department of Natural Resources (Iowa DNR) shapefiles, and created a GIS database. Data acquired included: shapefiles of wetland, floodway, floodplain, and conservation/recreation/park area boundaries; stream and trail lines, and locations of groundwater wells, leaking underground storage tank sites, and contaminated sites. Locations of schools, churches, cemeteries, and airports were also acquired. Municipal boundaries were acquired to identify limits of Hiawatha, Robins, Marion, and Cedar Rapids. The National Park Service database of sites listed on the National Register of Historic Places (NRHP) was reviewed, and no listed sites were shown within the corridor. However, the Linn County Assessor's files were reviewed to identify existing structures that were approximately 50 years or older, and these locations were digitized and added to the database. Additionally, lowa DNR's database of aerial photographs were reviewed and used to confirm that the corridor likely contains remnants of former farmsteads and other buildings that no longer exist in the most recent aerial photographs, and could exist as archaeological resources.

After developing the database and plotting the results on recent aerial photographs, we drove along public right-of-way (ROW) within the corridor and reviewed the presence of mapped resources and identified additional features that were added to the GIS database. There were several areas not completely visible from public ROW; consequently, the entire study area was not reviewed via windshield reconnaissance. The site visit did not involve verification/delineation of boundaries provided via shapefiles in the desktop review. Wetland and other waters of the U.S. boundaries acquired from U.S. Fish and Wildlife (USFWS) National Wetlands Inventory (NWI) are based on aerial photography review. However, we also noticed potential ditch wetlands north of Tower Terrace Road between Center Point Road and Robins Road, and that NWI wetlands near Meadow Knolls appear to be farmed. Eventually, wetland boundaries would need field delineation to confirm their actual location (as well as identify potential wetlands not shown in the NWI such as agricultural wetlands) and determine if construction of a transportation corridor would impact these features and
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## APPENDIX

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require acquisition of Clean Water Act Section 404 permits. Similarly, a data review identified known contaminated sites, but future work would also include a review for potential contamination associated with industrial sites throughout the corridor.

Table 1 identifies potential environmental constraints to address for each segment, and identifies which segments or portions of segments have been constructed or are being designed. Table 2 notes potential environmental permits or approvals that would be needed for each segment. The segment of Tower Terrance Road from Alburnett Road to $10^{\text {th }}$ Street has been completely constructed; consequently, although listed as one of the seven segments in the table, no constraints, permits, or approvals are listed. Portions of the 10th Street to Indian Creek Road segment and Indian Creek Road to lowa Highway 13 segment have been constructed.

|  | I-380-Robins Road | Robins Road Council Street NE | Council Street NE C Avenue NE | C Avenue NE Alburnett Road | Alburnett Road 10th Street | 10th Street - Indian Creek Road | Indian Creek Road Iowa Highway 13 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Design/ Construction Status | 1-380 Interchange design is ongoing for approximately 1,500 feet from west of the interstate to near Tower Terrace Mobile Home park. | Future design and construction | Design is ongoing for approximately 1,300 feet from Summerset Ave NE to C Avenue NE. Future design of Council Street NE to Summerset Ave. | Design is ongoing for approximately 6,500 feet of entire segment | Segment constructed of approximately 3,800 feet | Approximately 1,500 feet constructed from $10^{\text {th }}$ St east to Winslow Rd. From Winslow Rd to Indian Creek Rd. not constructed. | Approximately 1,400 feet constructed from Lennon Lane east to 35 ${ }^{\text {th }}$ Street. From 35 ${ }^{\text {th }}$ Street to lowa Highway 13 not constructed |
| Resources |  |  |  |  |  |  |  |
| Wetlands | Intermittent tributary to <br> Dry Creek with associated NWI wetlands. Potential ditch wetlands observed north of Tower Terrace Road. | Intermittent tributary to Dry Creek and associated wetlands. Perennial Dry Creek with associated NWI wetlands. | Two intermittent tributaries to Dry Creek and associated NWI wetlands. NWI wetland associated with a farm pond located south of Tiburan Road. | Four intermittent tributaries to Dry Creek and associated NWI wetlands. | N/A | Two intermittent tributaries to Indian Creek and associated wetlands. Perennial Indian Creek and associated NWI wetlands. | Three intermittent tributaries to Indian Creek and associated NWI wetlands. |
| Floodways and <br> Floodplains | --- | Floodway and 100-year floodplain for Dry Creek | --- | 100-year floodplain for a tributary to Dry Creek | N/A | Floodway and 100-year floodplain for Indian Creek and its tributaries. | --- |
| Threatened and Endangered Species | Low potential for presence of state or federally listed T\&E species. Area consists of agricultural, residential, and industrial land. | Medium potential for presence of state or federally listed T\&E species. Dry Creek lacks sufficient size and flow for mussel species. Potential roosting habitat for northern-long eared bat within creek riparian corridor. Remaining area consists of agricultural land or residential developments. | Medium potential for presence of state or federally listed T\&E species. Potential roosting habitat for northern long-eared bat in riparian areas within the segment. | Low potential for presence of state or federally listed T\&E species. Area consists of agricultural land and residential developments. Low concentration of trees providing suitable roosting habitat for northern long-eared bat. | N/A | Medium to low potential for presence of state of federally listed T\&E species. Indian Creek lacks sufficient size and flow for mussel species. Potential roosting habitat for northern-long eared bat within creek riparian corridor is less dense than Dry Creek. <br> Remaining area consists of agricultural land or residential developments. | Low potential for presence of state or federally listed T\&E species. Land consists of agricultural land. One riparian area associated with an intermittent stream west of lowa Highway 13 provides potentially suitable roosting habitat for northern long-eared bat. |
| Cultural Resources | Multiple potential historic structures, and potential sites for structural archeological remnants. | 1 existing potential historic structure. | 1 existing potential historic structure. | 2 existing potential historic structures. | N/A | 2 existing potential historic structures. | Potential sites for structural archeological remnants. |

## APPENDIX environmental memorandum

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|  | I-380-Robins Road | Robins Road Council Street NE | Council Street NE - <br> C Avenue NE | C Avenue NE Alburnett Road | Alburnett Road 10th Street | 10th Street - Indian Creek Road | Indian Creek Road Iowa Highway 13 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Regulated Materials | --- | The substation likely stores regulated materials. | - | - | N/A | One leaking underground storage tank site located on Linn-Mar High School property was closed with no further action required, and is adjacent to previously constructed subsegment. | - |
| Visual Aesthetics | Farmland, residential, and industrial facilities throughout segment. | Farmland, residential developments, and riparian corridor associated with Dry Creek located within the segment. | Farmland and residential developments throughout segment. | Farmland and residential developments throughout segment. | N/A | Farmland, residential developments, and riparian corridor associated with Indian Creek located within the segment | Farmland throughout segment, with some residences in western portion of segment. |
| Noise | Potential noise issue for Tower Terrace Mobile Home Park located west of Center Point Road. Remaining area consists of industrial/ agricultural land, with low potential for noise impact. | Single-family residential homes located within the segment makes noise a potential issue. | Single-family residential homes located within the segment makes noise a potential issue. | Believers in Grace Fellowship and Saint Mark Lutheran Church are located north of Main Street and east of $C$ Avenue NE. The presence of churches and single-family residential homes within the segment make noise a potential issue. | N/A | A middle school, high school, and single-family residence homes are located within the segment makes noise a potential issue. | Single-family residential homes located within the segment makes noise a potential issue. |
| Residences | Potential relocations. Tower Terrace Mobile Home Park is a likely area of an Environmental Justice (low-income) population. | Potential relocations of single-family residential homes. | Single-family residential homes. | Potential relocations of single-family residential homes. | N/A | Potential relocations of single-family residential homes. | Single-family residential homes. |
| Section 4(f) Parks and Recreational Areas | Trail along Center Point Road extends south from Tower Terrace Road. Cedar Valley Nature Trail crosses the segment. | --- | --- | --- | N/A | Track and recreational fields associated with Excelsior Middle School and Linn-Mar High School. Trail north and south of Tower Terrace Road, and east of $10^{\text {th }}$ Street. Proposed trail segment along Indian Creek, and extends east along tributary. | Trail north and south of Tower Terrace Road, east of $35^{\text {th }}$ Street, and south of $35^{\text {th }}$ Avenue. Proposed trail segment along tributary of Indian Creek, and extends northeast to connect with existing trail. |

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Table 2 - Potential Environmental Permits or Approvals by Segment

|  | 1-380-Robins Road | Robins Road Council Street NE | Council Street NE - C Avenue NE | C Avenue NE Alburnett Road | Alburnett Road - 10th Street | 10th Street - Indian Creek Road | Indian Creek <br> Road - lowa <br> Highway 13 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Potential NEPA documentation classification ${ }^{1}$ | Categorical Exclusion/Environmental Assessment | Environmental Assessment | Categorical Exclusion/Environmental Assessment | Categorical Exclusion/Environmental Assessment | N/A | Categorical Exclusion/Environmental Assessment | Categorical Exclusion |
| Wetland delineation/Section 404/401 Permit | Yes | Yes | Yes | Yes | N/A | Yes | Yes |
| Cultural resource surveys/ Section 106 consultation | Yes | Yes | Yes | Yes | N/A | Yes | Yes |
| Floodplain permit | No | Yes | No | Yes | N/A | Yes | No |
| Stormwater construction permit | Yes | Yes | Yes | Yes | N/A | Yes | Yes |
| Railroad crossing approval | No | Yes | No | No | N/A | No | No |
| Grading and other building permits | Yes | Yes | Yes | Yes | N/A | Yes | Yes |

${ }^{1}$ If Federal funds are used, FHWA and DOT will determine the level of NEPA documentation necessary. The documentation type listed is based on prior experience and may not reflect FHWA's final decision.

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## SEGMENT REVIEW SUMMARY

## I-380 to Robins Road

This segment will tie into the interstate interchange being designed. Environmental issues include potential ditch wetlands and the mobile home park adjacent to Tower Terrace Road, and the connection to the Center Point Road Trail and crossing of the Cedar Valley Nature Trail, with a parallel high-voltage transmission line. The Tower Terrace Mobile Home Park proximity may require relocations, affecting an environmental justice population. There are several potential historic structures within this segment that may or may not be directly affected. Two sites to note are the radio tower to the south of Tower Terrace Road and the mobile home park north of Tower Terrace Road that appears to have been established more than 50 years ago; these properties should be reviewed for potential historic significance. Iowa DOT is considering bike and pedestrian accommodations associated with the l-380/Tower Terrace interchange study; a future trail connection along Tower Terrace may be considered in future phases of development.

## Robins Road to Council Street NE

The Robins Road to Council Street NE segment presents the greatest environmental challenge, involving crossing Dry Creek (and its floodway, floodplain, and associated wetlands), the Canadian National Railway track (also used by Chicago, Central \& Pacific Railroad), and a high-voltage transmission line from the nearby substation parallels Dry Creek on its east bank. High-voltage transmission lines are also present in east-west alignment in the northern portion of the corridor. The Corridor Management Plan identified a potential wetland mitigation site in an area south of the proposed Tower Terrace Road, between the creek and railroad. The wooded area is along a riparian environment, and is likely suitable habitat for northern long-eared bats. There is also a potential historic structure west of Council Street, near the center of the corridor. The need for residential relocations are possible in this segment.

## Council Street NE to C Avenue NE

This segment includes a pond with likely wetlands near the center of the corridor and some groundwater wells. Highvoltage transmission lines are along the east side of Council Street. There would be a crossing of a Dry Creek tributary, with some wooded area being possible northern long-eared bat habitat.

## C Avenue NE to Alburnett Road

This segment presents geometric challenges for a crossing of C Avenue and Robins Road with an adjacent house of worship and nearby potential historic site. There is also a potential historic site near Alburnett Road. It is possible that there would be relocations required for single-family residential homes. There is a potential farmed wetland area associated with a tributary of Dry Creek. One of the crossings of a Dry Creek tributary includes a designated 100-year floodplain west of Alburnett Road.

## Alburnett Road to 10th Street

This segment has been constructed, so a description of environmental constraints within the corridor has not been compiled.

## 10th Street to Indian Creek Road

The crossing of Indian Creek in this segment includes a proposed trail, and designated floodway and 100-year floodplain, located near two potential historic structures. Extension of Tower Terrace Road east of Winslow Road would likely involve connection to the existing trail system on either side of Tower Terrace Road. It is possible that there would be

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relocations required for single-family residential homes. The wooded area along the riparian corridor is possible northern long-eared bat habitat.

Indian Creek Road to lowa Highway 13
Much of the potential alignment of Tower Terrace Road would traverse agricultural lands in this segment. The connection west to Indian Creek Road would intersect an Indian Creek tributary and a proposed trail. The alignment would intersect a transmission line and a narrow riparian area, which is potential bat habitat, near lowa Highway 13.

## PERMITS AND APPROVAL SUMMARY

A variety of permits and approvals would likely be needed before construction of the remaining unconstructed segments and subsegments of Tower Terrace Road corridor.

- National Pollutant Discharge Elimination System permits for grading disturbance of an acre or more of ground, with Stormwater Pollution Prevention Plans [all unconstructed segments and subsegments]
- Section 404 of the Clean Water Act permits for impacts to wetlands and other waters of the U.S. (such as Dry Creek and Indian Creek and their tributaries) with Section 401 Water Quality Certification [all unconstructed segments and subsegments]. Section 404 permitting requires compliance with requirements of Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act.
- Iowa DNR and local Floodplain Permits [Robins Road to Council Street, C Avenue to Alburnett Road, and $10^{\text {th }}$ Street to Indian Creek Road]
- Railroad crossing approval [Robins Road to Council Street]
- Linn County ROW permit [all unconstructed segments and subsegments]
- City of Cedar Rapids rezoning application, major erosion permit, preliminary site development plan and administrative site development plan, public ROW/excavation permit, driveway construction permit, and sewer permit [applicable segments and subsegments]
- City of Robins building permit, erosion control permit, ROW permit, and permits as needed for fence, maintenance, building demolition, and sign construction [applicable segments and subsegments]
- City of Hiawatha building permit, ROW permit, filling/grading/erosion control permit, and demolition permit [applicable segments and subsegments]
- City of Marion excavation/erosion control permit [applicable segments and subsegments]

If Federal funds are used, NEPA requirements would apply, and it is possible that use of SWAP funding might also involve NEPA compliance based on the use of Federal funds for design and proposed construction of the l-380 Tower Terrace Road interchange. The segments with potential to cause relocations, destruction of potential bat habitat, affects on historic sites, and other environmental impacts, as well as those with a high potential for controversy, are more likely to need to be addressed via an Environmental Assessment (such as the Robins Road to Council Street segment), whereas those segments with few environmental impacts (such as the Indian Creek Road to lowa Highway 13 segment) could potentially meet NEPA requirements via a Categorical Exclusion. Coordination with lowa DOT and FHWA will be needed to determine if SWAP funding will require NEPA compliance or more limited environmental and cultural reviews.
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## APPENDIX environmental memorandum



## APPENDIX environmental memorandum



## APPENDIX environmental memorandum



## APPENDIX environmental memorandum



## Memorandum

| Date: | Friday, January 04, 2019 |
| ---: | :--- |
| Project: | Tower Terrace Road Corridor Management Plan Update |
| To: | Corridor MPO |
| From: | Aleksander T. Nelson |
| Subject: | Structural Review |

## SELECTION OF BRIDGE TYPE - Dry Creek

A Precast Prestressed Concrete Beam (PPCB) bridge was selected as the bridge type to cross over Dry Creek due to cost and bridge length. The lowa Department of Transportation preliminary costing guide was used to determine the estimated cost per square foot for a conceptual design. A base price of $\$ 105$ per square foot plus contingency and mobilization for a total cost of $\$ 137$ per square foot is used for the bridge. Integral abutments and wall piers are assumed. Rail type is not established at this time, however an open rail would be preferred if drainage into the creek is acceptable.

## AESTHETICS

Aesthetic treatments including the use of surface textures and ornamentation with decorative stamped or colored concrete, decorative railings, lighting, or other miscellaneous details would be limited to add $10 \%$ or $14 \$ / \mathrm{SF}$ to the overall cost of the bridge.

## GEOMETRICS

A three span bridge with a superstructure depth of approximately $6^{\prime}-0^{\prime \prime}$ from the crown of the deck to the low chord was selected for the crossing over Dry Creek. A desktop review of the proposed crossing established a length of approximately 400 ' based on the existing ground surface and the potential flood plain. Based on the alignment of Dry Creek, the proposed bridge supports will likely not be skewed. Hydraulic modeling of Dry Creek will required during final design to verify the latest FEMA flood plain mapping and verify a no-rise condition. The length of the bridge will be impacted by this analysis; depending on water flow and potential channel modifications the length of the bridge could either grow or shrink. The width of the bridge includes four 12' driving lanes, two 10' shoulders which can accommodate a protected walkway/bike path, and two parapets for a total deck width of 71'-2". These geometrics follow the lowa Department of Transportation Standard Details for PPCB Bridges.

## OPTION \#1 - AT-GRADE CROSSING

Option \#1 is the least expensive option and includes PPCB Bridge crossing Dry Creek and an at-grade crossing at the railroad. Based on typical costs for a signalized railroad crossing, an at-grade crossing would add approximately $\$ 250,000$ to the project.

The total cost for the PPCB Bridge plus the at-grade crossing is $\$ 4,150,000$. Aesthetics are limited to add an additional $\$ 398,000$ to the total cost, for a total cost of $\$ 4,548,000$. The total cost was based on the length and alignment of the bridge as shown in the plan sheets for Tower Terrace Road dated 9-10-18.

## OPTION \#2 - GRADE SEPARATED CROSSING

Option \#2 uses the same PPCB Bridge crossing Dry Creek and changes the railroad crossing to a grade separation using a PPCB Bridge. The PPCB Bridge over the railroad has a base cost of $105 \$ /$ SF plus an allowance for work over the railroad, contingency and mobilization for a total cost of $169 \$ / S F$. The bridge would have an approximate length of 200 feet and the same width as the Dry Creek crossing. This bridge would also be a three span bridge with integral abutments and wall piers.

The total cost both bridges is $\$ 6,305,000$. Aesthetics are limited to add an additional $\$ 640,000$ to the total cost, for a total cost of $\$ 6,945,000$. The total cost was based on the length and alignment of the bridge as shown in the plan sheets for Tower Terrace Road dated 9-10-18.
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## SELECTION OF BRIDGE TYPE - Indian Creek

A Precast Prestressed Concrete Beam (PPCB) bridge was selected as the bridge type to cross over Indian Creek due to cost and bridge length. The lowa Department of Transportation preliminary costing guide was used to determine the estimated cost per square foot for a conceptual design. A base price of $\$ 105$ per square foot plus contingency and mobilization for a total cost of $\$ 143$ per square foot is used for the bridge. Integral abutments and wall or hammerhead piers are assumed. Rail type is not established at this time, however an open rail would be preferred if drainage into the creek is acceptable.

## AESTHETICS

Aesthetic treatments including the use of surface textures and ornamentation with decorative stamped or colored concrete, decorative railings, lighting, or other miscellaneous details would be limited to add $10 \%$ or $14 \$ /$ SF to the overall cost of the bridge.

## GEOMETRICS

A four span bridge with a superstructure depth of approximately $6^{\prime}-0^{\prime \prime}$ from the crown of the deck to the low chord was selected for the crossing over Dry Creek. A desktop review of the proposed crossing established a length of approximately 500' based on the existing ground surface and the potential flood plain. Based on the alignment of Indian Creek, the proposed bridge supports will likely be skewed between 30 and 45 degrees. Hydraulic modeling of Indian Creek will required during final design to verify the latest FEMA flood plain mapping and verify a no-rise condition. The length of the bridge will be impacted by this analysis; depending on water flow and potential channel modifications the length of the bridge could either grow or shrink. The width of the bridge includes four 12' driving lanes, two 10 ' shoulders which can accommodate a protected walkway/bike path, and two parapets for a total deck width of 71'-2". These geometrics follow the lowa Department of Transportation Standard Details for PPCB Bridges.

## COST

The cost for the PPCB Bridge crossing is $\$ 5,088,000$. Aesthetics are limited to add an additional $\$ 498,000$ to the total cost, for a total cost of $\$ 5,586,000$. The total cost was based on the length and alignment of the bridge as shown in the plan sheets for Tower Terrace Road dated 9-10-18.

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## Tower Terrace Road Cost Options for Structures at Dry Creek

ATN - 01_04_2019
Option 1 - PPCB Bridge over Dry Creek \& At-grade Railroad crossing

| PPCB Bridge - 400' Using lowa DOT standards, no skew |  |  | Cost |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Length = | 400.00 | ft | Base = | 105 | \$/sqft |
| Width $=$ | 71.16 | ft | Mobilization $=$ | 10\% |  |
| Area $=$ | 28464 | $\mathrm{ft}^{\wedge} 2$ | Contingency = | 20\% |  |
|  |  |  | Aesthetics = | 10\% |  |
|  |  |  | Total ( without Aesthetics) = | 137 | \$/sqft |
|  |  |  | Aesthetics $=$ | 14 | \$/sqft |

Railroad Crossing
At grade switches $=\quad \$ 250,000$

Option 1 - PPCB Bridge over Dry Creek \& At-grade Railroad crossing Estimate of Cost
Costs $=\$ 4,150,000$
Aesthetics = \$398,000
$\underline{\text { Total Costs }=\$ 4,548,000}$

Option 2 - PPCB Bridge over Dry Creek and over Railroad

| PPCB Bridge - 400' Using lowa DOT standards, no skew |  |  | Cost |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Length = | 400.00 | ft | Base = | 105 | \$/sqft |
| Width = | 71.16 | ft | Mobilization $=$ | 10\% |  |
| Area $=$ | 28464 | $\mathrm{ft}^{\wedge} 2$ | Contingency = | 20\% |  |
|  |  |  | Aesthetics $=$ | 10\% |  |
|  |  |  | Total (without Aesthetics) = | 137 | \$/sqft |
|  |  |  | Aesthetics $=$ | 14 | \$/sqft |
| PPCB Bridge - 200' Using lowa DOT standards, no skew |  |  |  | Cost |  |
| Length = | 200.00 | ft | Base = | 105 | \$/sqft |
| Width = | 71.16 | ft | Railroad = | 25 | \$/sqft |
| Area $=$ | 14232 | $\mathrm{ft}^{\wedge} 2$ | Mobilization = | 10\% |  |
|  |  |  | Contingency = | 20\% |  |
|  |  |  | Aesthetics $=$ | 10\% |  |
|  |  |  | Total (without Aesthetics) = | 169 | \$/sqft |
|  |  |  | Aesthetics $=$ | 17 | \$/sqft |

Option 2 - PPCB Bridge over Dry Creek and over Railroad Estimate of Cost
Costs = \$6,305,000
Aesthetics $=\$ 640,000$
Total Costs $=\$ 6,945,000$

# Tower Terrace Road Cost for Structure at Indian Creek 

ATN - 01_04_2019

PPCB Bridge over Indian Creek


| Bridge over Indian Creek Estimate of Cost |  |
| ---: | ---: |
| Costs $=$ | $\$ 5,088,000$ |
| Aesthetics $=$ | $\$ 498,000$ |
| Total Costs $=$ | $\$ 5,586,000$ |

Highway Division

## H40-06 THREE SPAN PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE STANDARDS

## APPENDIX future ando use map



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## CONCEPTUAL PLAN AND PROFILE SHEETS overvew



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## CONCEPTUAL PLAN AND PROFILE SHEETS edeewood road to west toge of l-38 inticchange



## CONCEPTUAL PLAN AND PROFILE SHEETS I-38o interchange (gy iowa dot)



## CONCEPTUAL PLAN AND PROFILE SHEETS east tege of l-380 interchange thru center point road



## CONCEPTUAL PLAN AND PROFILE SHEETS center point road to stamy road



## CONCEPTUAL PLAN AND PROFILE SHEETS stamy road т о овімs road



## CONCEPTUAL PLAN AND PROFILE SHEETS stamy road to robins road



## CONCEPTUAL PLAN AND PROFILE SHEETS stamy road to robins road \& robins road to council street (bridges over dry creek and canadian national railway)



## CONCEPTUAL PLAN AND PROFILE SHEETS robins road to council street (bridges over dry creek and canadian national railway)



## CONCEPTUAL PLAN AND PROFILE SHEETS robins road to council street (bridges over dry creek and canadian national railway)



## CONCEPTUAL PLAN AND PROFILE SHEETS robins road to council street (bridges over dry creek and canadian national railway) \& council street to turtie run extended



## CONCEPTUAL PLAN AND PROFILE SHEETS council street to turtle run extended \& turtle run extended to summerset extended



## CONCEPTUAL PLAN AND PROFILE SHEETS turiti run Exienod to summersi i xitenoe



## CONCEPTUAL PLAN AND PROFILE SHEETS turtle run extended to summerset extended \& summerset extended to cavenue



## CONCEPTUAL PLAN AND PROFILE SHEETS summerset extended to c avenue \& cavenue to 900 feet east of meadowknouls road



## CONCEPTUAL PLAN AND PROF|LE SHEETS cavenue to 900 feet east of meadowknolls road \& 900 fett east of meadowknolus to $1 / 4$ mile west of alburnett road



## CONCEPTUAL PLAN AND PROFILE SHEETS 900 feet east of meadowknolus to $1 / 4$ mile west of alburnett road



## CONCEPTUAL PLAN AND PROF|LE SHEETS 900 feet east of meadowknolls to $1 / 4$ mile west of alburnett road $\& 1 / 4$ mile west of alburnett road



## CONCEPTUAL PLAN AND PROFILE SHEETS $1 / 4$ mile west of alburnett road



## CONCEPTUAL PLAN AND PROFILE SHEETS exsting tower trrace road



## CONCEPTUAL PLAN AND PROFILE SHEETS exsting tower treace road



## CONCEPTUAL PLAN AND PROFILE SHEETS exsting towertrrace road



## CONCEPTUAL PLAN AND PROFILE SHEETS relocated winslow to exlsting winslow (bridge over indian creek)



## CONCEPTUAL PLAN AND PROFILE SHEETS relocated winslow to exlsting winslow (bridge over indian creek)



## CONCEPTUAL PLAN AND PROFILE SHEETS relocated winslow to existing winslow (bridge over indian creek) \& existing winslow to east edge of the ridge at indian creek



## CONCEPTUAL PLAN AND PROFILE SHEETS exsting tower trrace road



## CONCEPTUAL PLAN AND PROFILE SHEETS existing winslow to east edge of the ridge at indian creek



## CONCEPTUAL PLAN AND PROFIE SHEETS existing winslow to east edge of the ridge at indian creek \& the ridge at indian creek to one mile west of ia highway is



## CONCEPTUAL PLAN AND PROFILE SHEETS the ridge at indian creek to one mile west of la highway 13 \& one mile west of ia highway 13



## CONCEPTUAL PLAN AND PROFILE SHEETS one mile west of ia highway 13 to ia highway 13



## CONCEPTUAL PLAN AND PROFILE SHEETS one mile west of ia highway 13 to ia highway 13



## CONCEPTUAL PLAN AND PROFILE SHEETS one mile west of ia highway 13 to ia highway 13



## CONCEPTUAL SIDE STREET SHEETS



## CONCEPTUAL SIDE STREET SHEETS



## CONCEPTUAL SIDE STREET SHEETS



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## CONCEPTUAL SIDE STREET SHEETS



## CONCEPTUAL SIDE STREET SHEETS




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